Published Quarterly

JOURNAL *of the* Royal United Service Institution.

Vol. LXVII., No. 466.—MAY, 1922.

PUBLISHED AT THE

Royal United Service Institution, Whitehall,
LONDON, S.W. 1.

Telegraphic Address: "RUSSATUS, PARL, LONDON."

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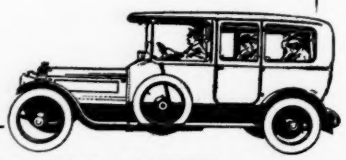

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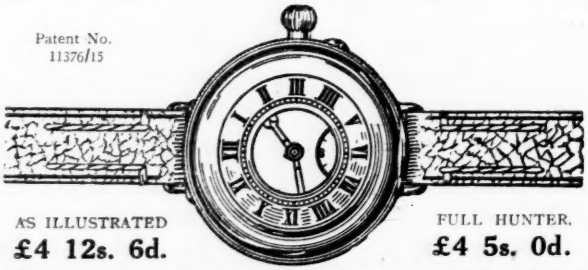

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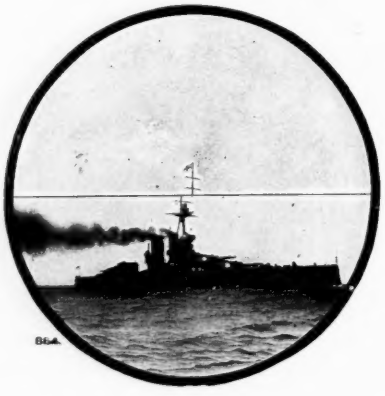

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SECRETARY'S NOTES.

I.—Royal Visit.

H.R.H. Prince Henry visited the Institution on 15th February, and expressed himself as being very interested with the Museum and its Exhibits.

II.—Council.

General Lord Horne, G.C.B., K.C.M.G., A.D.C., was elected a Member of the Council under Chapter iv, paragraph 9 of the bye-laws, vice Lieut.-General Sir E. S. Bulfin, K.C.B., C.V.O., who has proceeded on Foreign Service.

The following Officers were duly elected Members of the Council at the Anniversary Meeting, viz. :—

Admiral-of-the-Fleet Earl Beatty, G.C.B., O.M., G.C.V.O., D.S.O.
Admiral Sir R. G. O. Tupper, K.C.B., C.V.O.
General Sir E. G. Barrow, G.C.B., G.C.S.I.
Lieut.-General Sir H. S. G. Miles, G.C.B., G.C.M.G., G.B.E., C.V.O.

III.—Chairman of the Council.

Lieut.-General Sir H. S. G. Miles, G.C.B., G.C.M.G., G.B.E., C.V.O., has been appointed Chairman for 1922–1923.

Admiral Sir R. G. O. Tupper, K.C.B., C.V.O., has been appointed Vice-Chairman for 1922–1923.

IV.—Committees.

The Committees for 1922–1923 are as follows :—

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V.—Officers joined.

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Major A. G. C. Dawnay, C.B.E., D.S.O., Coldstream Guards.
Lieutenant G. S. H. R. V. de Gaury, M.C., Essex Regiment.
Second Lieutenant G. W. Browning, Suffolk Regiment.
Lieutenant C. H. Drage, R.N.
Commander L. G. D. Way, late R.N.
Captain H. F. E. Smith, D.S.O., K.R.R.C.
Second-Lieutenant F. M. Lassetter, London Scottish.
Captain R. H. Campbell, M.C., R.M.L.I.
Captain D. F. McConnel, D.S.O., R.F.A.
Major J. H. Stafford, R.E.
Major J. W. G. Wyld, D.S.O., M.C., Oxfordshire & Buckinghamshire Light Infantry.

VI.—Gold Medal Essay (Military) 1921.

The Council have awarded the Gold Medal of the Institution, together with the First Trench-Gascoigne prize of 30 guineas for the Military Essay of 1921, to Flight-Lieutenant C. J. Mackay, M.C., D.F.C., R.A.F.

The Second Trench-Gascoigne Prize of 20 guineas to Squadron-Leader A. A. Walser, M.C., D.F.C., R.A.F.

The Third Prize of 10 guineas to Captain Hon. R. A. R. P. E. Erle-Drax, D.S.O., R.N.

The subject of the Essay was as follows: "The influence in the future of Aircraft upon problems of Imperial Defence."

Ten Essays were submitted.

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The Institution is prepared to arrange for the repairs to Regimental Colours and Cavalry Standards, in service or otherwise. Enquiries having been made as to the cost of such repairs, the Secretary begs to state that the average cost is from £8 to £10 a Colour, of which the Institution only receives £1 to cover the cost of materials, carriage, etc.

The Colours of the following Regiments have been repaired by the Institution since the publication of the last list, viz.:—

1st Bn. Gloucestershire Regiment.
Dervish Standard (R.U.S.I.).
Blackheath Light Cavalry Volunteers Guidons.
Blackheath Militia.
A Beloochee Standard (Cheshire Regiment).
2nd Bn. South Staffordshire Regiment.
23rd Light Dragoons (Squadron Guidon).

A Royal Standard of King George III.
2nd Bn. Royal Berkshire Regiment.
King's Colour (Regiment unknown).
Royal Merioneth Militia.
South Hampshire Light Infantry Militia.
1st Bn. Border Regiment.
2nd Bn. King's Shropshire Light Infantry.
West Kent Militia.
South Wales Borderers.
1st Bn. Royal Irish Fusiliers.
An old Spanish Colour (belonging to the above Regiment).
Royal Monmouthshire Engineers.
88th Carnatic Infantry.
28th Madras Infantry.
2nd Bn. Royal Welch Fusiliers.
1st Bn. K.E.O. Grenadiers (I.A.).
Union Jack (108th Infantry (I.A.).
20th Hussars (Peninsular Guidons).

VIII.—Important Notice.

The attention of Members is drawn to the Annual Report and the remarks made at the General Meeting on the subject of New Members, and the urgency of obtaining as many as possible. It is hoped that each Member will endeavour to obtain one new Member; a Banker's Order is enclosed in every JOURNAL with this object. If this could be done, there would be no further cause for anxiety with regard to the sufficiency of income.

IX.—Royal Processions.

The Council have decided that in future on occasions of Royal Processions and others passing down Whitehall to limit the number of Members and their friends to be admitted into the Institution Buildings. Members only will be admitted to the Institution Building, the number being limited to 100. The Museum will be closed to the Public, and the windows of the Banqueting Hall will be available for Members and one friend personally introduced (name to be supplied), the number being limited to 150.

Tickets will be issued in the order of application, and the name of the Member and his friend will be written on each ticket and are not transferable.

The arrangements with regard to the Council Room, Secretary's Office, and the Museum Entrance Yard remain as heretofore, but Members of the Council should apply previously for tickets.

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This Standing Order of the Council does not prejudice Chapter iv, Section 21, of the bye-laws, which deals with occasions on which stands are erected, and a charge made for the tickets for the same when such tickets will be allotted by ballot.

X.—History of the British Army Fund.

The Council are endeavouring to raise a sum of money to enable the Hon. J. W. Fortescue to complete this History, and to somewhat recompense

Major T. H. Sebag-Montifiore, D.S.O., M.C., R.H.A.
Lieutenant C. M. Clode, M.C., Norfolk Regiment.
Major C. R. L. FitzGerald, D.S.O., I.A.
Captain N. G. Hind, M.C., I.A.
Lieutenant S. W. Joslin, R.E.
Major W. Clemson, D.S.O., Dorsetshire Regiment.
Lieut.-Colonel H. L. Anderton, T.D., 6th Bn. West Yorkshire Regiment (T.A.).
Captain C. C. Malden, Royal Sussex Regiment.
Captain A. T. Forman, M.C., R.F.A.
Captain J. G. Hayter, M.C., R.F.A.
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him for his labours (25 years) and the great financial outlay incurred in producing the 10 volumes already published.

	£	s.	d.
Subscriptions already acknowledged	186	14	6
Officers' Mess, 2nd Bn. Connaught Rangers	5	0	0
Officers' Mess, 1st Bn. 21st Punjabis	5	0	0
Officers' Mess, The Depôt, Middlesex Regiment... ...	3	3	0
Major H. L. Archer-Houblon	1	1	0
Lieut.-Colonel N. Bannatyne	2	2	0
D. B. Wilson, Esq.	20	0	0
Officers' Mess, 2nd Bn. King's Own Scottish Borderers ...	5	0	0
	£228	0	6

It is hoped that Officers and Regimental Messes will become subscribers.

XI.—Extra Subscriptions.

The Council have pleasure in reporting that the following additional Members have sent extra subscriptions towards the cost of the production and postage of the JOURNAL, viz. :—

	£	s.	d.
Amount already acknowledged	33	5	4
Captain D. C. Anderson	0	10	8
Rear-Admiral H. Chatterton	2	2	0
Captain E. F. Masters	0	10	0
Commander F. M. Kerr, R.N.	1	1	0
	£37	9	0

XII.—Museum Purchase Fund.

This Fund has been opened with the object of purchasing suitable exhibits which are from time to time offered to the Museum, or which are put up for sale at various auctions. The Council hope it will receive support from Members of the Institution who are interested in the Museum.

	£	s.	d.
Amount already acknowledged	50	0	0
Colonel C. H. Colvin, C.B., D.S.O.	3	3	0
	53	3	0
Less expended to date	31	17	10
	£21	5	2

XIII.—The Closing of the Institution for Cleaning.

The Institution will be closed for cleaning on Monday, 14th August, and will re-open on Monday, 28th August. The Museum, however, will be open as usual.

XIV.—Change of Rank and Address.

The attention of Members is called to the necessity for communicating any changes of rank or address to the Secretary. It is essential that such notification should be made in writing. The 9th day of the month of issue is the last day

on which such change can be notified in order to take effect for the delivery of the JOURNAL of the current quarter. If such changes are not notified, Members themselves will be responsible if their JOURNALS fail to reach them through being wrongly addressed, and Officers are requested to write their names, with initials, distinctly on such communications. Several signatures have recently been received which it has been impossible to decipher, and as there are many instances of Members bearing the same name and initials, it is requested, therefore, that they will add their rank. The Council beg to draw the attention of Members who do not have the JOURNAL sent to them, and have not registered an address with the Secretary, to the fact that they (the Council) cannot be held responsible if such Members do not receive any notices that may from time to time be sent out.

XV.—The Museum.

The amount taken for admission to the Museum during the past quarter was :—

£64 6s. od. in February.
£76 11s. od. in March.
£142 3s. 3d. in April.

ADDITIONS.

(3481) An Aquatint published by Messrs. Burkitt and Hudson, representing exploits in the Battle of Waterloo, and dedicated to the British Army. Published in August, 1816.—Deposited by Captain H. A. Parker.

(3482) An Aquatint from the painting by W. Heath, engraved by Henry Meyer, representing Field-Marshal His Grace the Duke of Wellington and those Officers who have adorned the glories of the Peninsular War.—Deposited by Captain H. A. Parker.

(7560) A Mezzotint of the Battle of the Boyne, 1st July, 1690, from the painting by Wryke, engraved by T. Kitchen, in the collection of the Earl of Leicester. It shows a portrait of King William III, and the index at the foot records the names of the various Officers present. It is interesting as showing the types of guns in use at that time, and the uniforms of the period.—Purchased.

(7561) A Mezzotint of Lieut.-General Viscount Hardinge, G.C.B., and Staff, on the field of Feroshuhur, from the painting by Francis Grant, A.R.A., and engraved by Samuel Reynolds and published in 1849.—Given by Captain H. A. Parker.

(7562) A large Silver Cup surmounted by a Mounted Light Dragoon with two dismounted soldiers bearing the regimental guidons as supporters, and having the following inscription: "Presented to Lieut.-Colonel John Bennett Hearsey of the 6th Light Cavalry, by Major-General Watson and other Officers of the Bengal Cavalry, as a token of their regard and esteem, 1846." "Delhi, Laswarrie, Deig, Java, Seetabuldee, Ava, Bhurtpore, Afghanistan, Ghuznie, Jeelalabad, Cabul, Meanee, Hydrabad, Maharazpoor, Punniar, Ferozeshuhur, Alleewal, Sobraon." Major-General Sir John Hearsey, K.C.B., was the first Colonel of the 21st Hussars. —Given by Mrs. Hearsey.

(7563) General Officer's gold-laced Sash, a Light Dragoon Officer's Girdle, two pairs of gilt Spurs, and Medal Ribbons (2) of Major-General Sir John Hearsey, K.C.B. (Colonel, 21st Hussars, 1861). Lieut.-General Sir John Bennett Hearsey, K.C.B., entered the Bengal Cavalry as a Cadet in 1806 at the age of 13, served in the Nepal, Pindari, Maratha and Second Sikh Wars, and on the outbreak of the Mutiny quelled the initial rising at Barrackpore. His Indian service and that of his father totalled nearly a hundred years, from the days of Clive to those of Canning.—Given by Mrs. Hearsey.

(7564) The Kimberley Star, 1899–1900, given by the Mayor of Kimberley to the garrison of that town in 1900, commemorating the Siege. —Purchased.

(7565–7572) A series of Water-colour Paintings depicting scenes in the Crimea, painted by the late Major-General C. H. Owen, R.A.—Given by Lieut.-Colonel F. Cunliffe-Owen, C.M.G.

(7573) Sinn Feiners' Flag, which was removed from the South Dublin Union, after their surrender in May, 1916. The flag was taken by No. 2317 Sergeant W. Austin, 3rd Bn. Royal Irish Rifles. There are numerous bullet holes in the flag, and the pole, which is surmounted by an Irish pike head, has also been pierced in two places.—Given by General the Rt. Hon. Sir C. F. N. Macready, G.C.M.G., K.C.B.

(7574) A seven-pounder brass Field-Gun, which originally belonged to the Egyptian Force under Hicks Pasha, annihilated by the Dervishes in the Sudan in 1883. It was recovered at the Battle of Omdurman, 3rd September, 1898, by the 21st Lancers.—Given by the Officers of the 21st Lancers (Empress of India's). (To be returned, if desired, to the 21st Lancers, if that Regiment is re-raised.)

(7575) The Commanding Officer's and two Squadron Guidons of the 20th Light Dragoons carried by that Regiment through the Peninsular War.—Given by the Officers of the 20th Hussars. (To be returned, if desired, to the 20th Hussars, if that Regiment is re-raised.)

(7576) An Engraving of the Château of Hougoumont, Waterloo, from the painting by Paul Lauters. The plate is the property of Count d'Outrement, the owner of Hougoumont, and his arms are stamped on the engraving. These engravings are for sale, the proceeds of which are devoted towards the maintenance of the Château.—Given by Colonel R. Maton, C.B., C.V.O., Belgian Military Attaché.

(7577) A Drum which was used in America to collect funds for the British Red Cross during the South African War (1899–1902). It was presented to Field-Marshal Earl Roberts, when he was commanding the British Troops in South Africa, by Colonel G. E. Gourard, a former Inspector-General of Cavalry, U.S.A. Army. It is interesting to note that the Flags of the British Empire and the United States are entwined together, foreshadowing the Alliance of 1917.—Given by The Countess Roberts.

(7578) A Portrait in Oils of Sir Robert Seppings, F.R.S. (1767–1840), who was the inventor of the Seppings' block and various inventions on ship construction. He held the office of Surveyor of the Navy, 1813 to 1832. Below the picture is the following inscription: "To whose abilities and exertion this country is mainly indebted for its most valuable improvements to Naval Architecture, which confer a lasting benefit on the British nation" (House of Commons Report, 30th April, 1819).

(7579) A large Silver-gilt Cup, presented to Sir Robert Seppings, F.R.S., Surveyor-General of the Navy, 1813 to 1832, by H.I.M. The Czar of Russia, richly embossed with figures representing "Paris and the apple of discord."

(7580) A valuable diamond Ring, presented to Sir Robert Seppings F.R.S., Surveyor-General of the Navy, 1813 to 1832, by H.M. The King of the Netherlands.

(7581) The Copleian Gold Medal of the Royal Society awarded to Sir Robert Seppings, F.R.S., Surveyor-General of the Navy, 1813 to 1832, in 1818.

(7582) The Medal of the Society of Arts and Commerce, awarded in 1804 to Mr. Robert Seppings "for obviating the necessity of lifting Ships."

(7583) Model of the Stern of a Battleship, designed by Sir Robert Seppings, F.R.S., Surveyor-General of the Navy, 1813–1832.

(7584) Model of the Stern of a Frigate, designed by Sir Robert Seppings, F.R.S., Surveyor-General of the Navy, 1813–1832.

(7585) Grant of Arms to Sir Robert Seppings, Knt., dated February 18th, 1825, by the Earl Marshal, the Duke of Norfolk.

All the above (Nos. 7578–7585) were bequeathed by Captain H. S. Harrison, late 7th Royal Fusiliers.

(7586) A gold Locket, enclosing some hairs from the tail of "Copenhagen," the Duke of Wellington's Waterloo charger. They were cut from the horse's tail on 13th March, 1830, the day the animal died, by Samuel Wise, one of the Duke's servants, and given by his daughter to the Reverend Canon Maturin (the Father of the donor).—Given by Mrs. Speed.

(7587) Officer's full-dress Sabretasche of the 20th Hussars, discontinued in 1903.—Given by Colonel W. J. Irwin, late 20th Hussars.

(7588) Officer's Silver Pouch, 20th Hussars.—Given by Colonel W. J. Irwin, late 20th Hussars.

(7589) The Flag which the traitor Roger Casement brought with him from Germany in a submarine vessel in 1916, shortly before the Rebellion in Dublin; he landed at Fenit, County Kerry. The flag, which is green in colour, has the arms of the City of Limerick on it, and was taken with him by a detachment of the Royal Irish Constabulary. Casement was subsequently tried and convicted of High Treason, degraded from his Knighthood, and executed at Pentonville Prison, 3rd August, 1916.—Given by the Officers of the Depôt, Royal Irish Constabulary, Dublin.

(7590) The following Officer's Uniform of the 9th Bombay Infantry, formerly belonging to Major F. Fanning, who joined in 1838 and retired in 1856: Dress Coatee, pair of Epaulettes of the Hon. East India Coy., a Light Infantry crimson Sash, Shell Jacket.—Given by Miss Fanning.

(7591) An Anti-Gas Oxygen Apparatus, found in a German Gun Emplacement near Frécourt after the Battle on the Somme on 5th July, 1916. It consists of a steel cylinder containing compressed oxygen, a rubber bag into which the oxygen is passed for breathing purposes, a tin receptacle containing a cartridge of protoxide of potash through which the oxygen from the gas bag passes to a breathing tube with rubber mouthpiece, and full instructions for their use in German.—Given by Colonel C. N. Simpson, D.S.O., R.F.A.

(7592) Decorations and Medals of Lieut.-General Sir Thomas Monteath-Douglas, K.C.B., of Douglas-Support, A.D.C. to H.M. Queen Victoria, who served in the 35th Bengal Light Infantry:—

(1) The Order of the Dooranee, 2nd class, given to British Officers by Shah Shoojah in 1839 (the pearls (12) are strung on a silver chain).
(2) First Indian General Service Medal with clasps for Bhurtpoor and Nepaul.
(3) Afghan Medal (Queen's).
(4) Ghuznee Medal (gilded and cased in glass).
(5) Jellalabad Medal (gilded and cased in glass).
(6) Cabul 1842 Medal (gilded and cased in glass).
(7) Seringapatam Medal, 1799, in silver gilt. Ribbon of the Order of the Bath.—Given by Miss Monteath Scott.

XVI.—Lectures.

The Council are prepared to receive offers of Lectures and Papers for the Autumn Session. It is specially hoped that Naval Officers will come forward.

THE JOURNAL

OF THE

Royal United Service Institution.

VOL. LXVII. MAY, 1922. No. 466.

[Authors alone are responsible for the contents of their respective Papers. All communications (except those for perusal by the Editor only) should be addressed to the Secretary, Royal United Service Institution.]

THE EFFECT OF THE WAR ON FIELD ENGINEERING.

By COLONEL R. N. HARVEY, C.B., C.M.G., D.S.O., Chief Engineer, Aldershot Command.

On Wednesday, 14th December, 1921.

LIEUT.-GENERAL SIR E. S. BULFIN, K.C.B., C.V.O., in the Chair.

THE CHAIRMAN: Ladies and Gentlemen, I hardly think that Colonel Harvey needs any introduction from me. We all know him as Chief Engineer at Aldershot, and he has had a great deal to do with the making of our new Training Manual. Everybody who was out on the Western Front has probably met him. The subject of his lecture is one of the most important that have to be dealt with at the present time. Most of us, I am sure, have seen engineers doing things that infantry and other arms ought to have been doing. I have not read the lecture, and I am therefore looking forward with the greatest pleasure to hearing it, because I know Colonel Harvey will speak with the knowledge of one who has seen things and felt them and knows all about them. I have now much pleasure in asking Colonel Harvey to deliver his lecture.

LECTURE.

I. INTRODUCTORY.

1. Before commencing my lecture I wish to make it quite clear that, although I am an Engineer Officer, I am going to try to treat the

subject as one which interests the Army as a whole; and I shall, therefore, avoid all references to the more technical side of Field Engineering, for which the R.E. are usually held responsible, except in very general terms.

2. I have also to say that I have not provided any plans, photographs or slides, for the subject is so wide that any attempt to illustrate my remarks by these means would keep you here for an indefinite period; besides I think I may assume in these days that my audience here is fairly well acquainted with at least the appearance of the products of Field Engineering in War.

II. General Remarks.

1. The effect of the War on the science of Field Engineering had two distinct characteristics:—

A. It crystallised military thought on the subject which was half-formed before the War into definite opinion.

B. It demanded various modifications in the details and designs of works in the field and the addition of some new subjects; *but* without seriously changing the general principles laid down before the War.

2. As regards the first of these. Modern military opinion demands:—

(i) A greater knowledge of the subject by all arms.

(ii) A greater number of men specially trained and skilled such as R.E., and men semi-skilled such as Pioneers.

3. As regards the second. The lessons of the War have been carefully collated and assembled in book form in the new edition of the Manual of Field Engineering, shortly to be published.

III. The Effect on Military Opinion.

Let us first of all examine the new-formed military opinion under its two sub-heads:—

(i) *The Demand for Increased Knowledge.*

(i) That a greater knowledge is required by the Army generally is very clearly laid down in the Preface of the M.F.E., and as this has not yet been published I will read some extracts from it.

"Our armies are trained in order to defeat the enemies of the Empire in battle . . . All past wars have proved that victory can only be won as the result of offensive action . . . Nevertheless in any campaign it will not be found practicable to employ offensive tactics at all times and in all places. In order to provide the strongest possible force at the point of attack, a defensive attitude on other parts of the front will be necessary. . . After a successful attack, the objective

gained must be secured against recapture by counter-attacks. For these purposes, and others, it is necessary that all ranks of the Army should be trained in the methods of field fortification.

"Field Engineering does not consist, however, solely of field fortification. In the conduct of an attack, it is necessary that the troops should be able to construct or improve their communications, and to demolish the defences and communications of the enemy. For their own maintenance in the field, it is necessary to construct and maintain living accommodation, sanitary works, water supply, and washing and bathing facilities.

"For such portions of the above works as require skilled technical workmanship, the Royal Engineers provide a body of men specially trained. . . . All arms of the Service, however, must be trained to carry out their own requirements in field engineering to the utmost extent possible. . . . The numbers of engineers available will never be sufficient to do more than a very small proportion of the engineering work necessary in the field, and their labours should be strictly confined to works of the type which it is not possible for the other arms to do themselves. . . . If this is not strictly enforced, important technical works which can be done only by engineers will be left undone."

You will observe how the opening paragraph of the pre-war Manual has been expanded.

1. Up to the commencement of the War, the field engineering training for the Cavalry and the Infantry had been confined to elementary trench-digging, obstacles, use of brushwood, bridging expedients and camping arrangements; other arms did little or nothing.

Fire stepping, revetting, head cover and overhead cover and wire entanglements, were regarded as technical and were built or erected by the R.E.

2. The science of siting trenches was limited to siting individual trenches, and this was not always done with the eye at approximately the same level as that of the occupant of the trench.

3. The choice of a position and the siting of the works on a defensive front of several miles were only occasionally practised on Staff Rides and Manœuvres, and the number of officers who had studied a defensive position in detail and who had seen one laid out was relatively small.

4. Positions were laid out in one line of defence—no support or reserve lines, and no communication trenches. These were considered unnecessary because the Commander usually intended to overthrow the assault by the counterstroke with his mobile reserves. Besides, the time allowed at manœuvres did not permit of lengthy engineer operations.

5. It may be safely stated also, that very few officers had the least idea how to work out how many men were required to do a job of work

and how long that work would take. The working party table was regarded as technical, and the perquisite of the R.E.

6. By the end of the first battle of Ypres, the losses in the highly-trained, original Expeditionary Force, and especially among the Field Companies R.E., the only technical troops we had in those days, rendered the performance of the most ordinary work extremely difficult. The reinforcements were unskilled in trench work. The construction of wire entanglements in close proximity to the enemy caused particularly heavy casualties among the R.E.

7. The standard of knowledge of Field Engineering was rapidly falling, but the event which brought the demand for more knowledge to a climax was the use of hand-grenades by the Germans.

8. This brought the soldier into direct contact with explosives, a material of which he had hitherto been kept in complete ignorance. Even the W.D. hand grenades, made in the arsenal at Woolwich—brass-capped, red lacquered and rendered safe in three different ways—were withheld from him, and no wonder: they cost two guineas each, and even the issue to a Field Company for annual practice was limited to two live grenades!!

9. Without warning, Tommy was presented with the locally-made plum-and-apple hand-grenade, to be lit with a match, and told to go out to war. The appalling accidents which happened at once resulted in the formation of bomb schools. Trench mortars evolved by the same dreadful procedure were also made subjects of special teaching.

10. The rapidity with which the troops assimilated knowledge which up to the present was supposed to be beyond them, led to the gradual development of schools of instruction in methods of all kinds of engineering, which culminated in the formation of the "First Army" School of Instruction in the very technical art of making tunnelled dugouts.

11. This was towards the end of 1917, when we had blown the Bosche off the face of the earth with our mines. The Tunnelling Companies were released from mining to concentrate on the more useful work of dugout-making, and it was to augment their efforts to supply the demand for safe accommodation that this school was formed.

12. It was most successful from the very start, and after a few weeks' training the men who went through the course were able in good ground to set out, tunnel and timber proper shell-proof tunnelled dugouts, which had hitherto been relegated to the R.E. entirely.

13. I think I have said enough now to show that an important result of the War was the demand for more knowledge in Field Engineering.

(ii) Demand for Greater Numbers of Skilled Men.

1. Now, as regards the second point—the extra numbers of skilled men—I must ask you to carry your minds back to 1914. The Expedi-

tionary Force of 1914 went to France with two Field Companies per Division. This was the total of specially-trained skilled labour for Field Engineering, excluding signals. By November, 1914, there was a definite feeling that the number of Sappers was insufficient. It was quite impossible to take them out of the line for rest because there was so much work to be done. That was when the R.E. were supposed to do all field engineering, except mere digging.

2. The strain of being retained long periods in the front line when the remainder of their formation is nominally "at rest" had a disastrous effect on the mentality of the officers and men of the Field Companies, though they were the very last people to admit this; but the work undoubtedly suffered.

3. After representation of the case to the War Office, we received a certain number of Territorial Field Companies; as a sort of admission of the principle that there should be three Field Companies per Division and a start in supplying them. These units, though they themselves were very pleased to come out early to France, were torn from their rightful organisations, and the innovation was, consequently, not popular with the authorities; but the Companies did sterling work and for a time eased the situation.

4. The principle of three Field Companies per Division was generally adopted in the Kitchener Armies.

5. But even this addition to the skilled men was not sufficient, and later, on Lord Kitchener's advice, Pioneer Battalions were formed.

6. Many of these had, at the time of their formation, no claim to be called Pioneer Battalions. The transformation was usually effected by a telephone message or telegram to an unsuspecting Commanding Officer of a Battalion. However, having been once given the name, they buckled to their work and were really splendid people. The worst point about them was—that they were so splendid, that the G.O.C.'s Divisions could not resist the temptation of looking upon them as Infantry to be used for a special purpose; and frequently it happened that, after a push, when the call for work was greatest, the Pioneer Battalion, having covered itself with glory in the battle, was found to be either 50 per cent. under strength or just fitted up with untrained reinforcements who, however willing and fit, were quite unable to replace their fully-trained comrades who had become casualties.

7. The question of the numbers of skilled personnel to be allotted to a Division was, after the War, examined by a Committee on Engineer Organisation, and this Committee recommended the creation of Engineer Battalions of about 2,000 all ranks, by combining the Divisional Pioneer Battalions with the Divisional Engineers. This was, of course, an ideal organisation, and one not likely to be realised in the present state of the Country's finances; but it is convincing proof of how deeply the want of skilled men was felt by the Army.

8. It has been decided, for the present, that the peace establishment of the Divisional Engineers shall be roughly as it was before the War; that is, supposing we had three Field Companies per Division, viz., about 500 all ranks.

9. You must now understand that I have only so far dealt with the Field Engineering work in the Division. Behind these formations there were many sorts of specially-formed units R.E., formed for all sorts of purposes. Army Troop Companies R.E., for R.E. work behind the Divisions, nominally, but frequently assisting the Field Companies nearer the front. Electrical and Mechanical Companies, whose work commenced at the base parks and reached in the mining systems to many yards in front of the front trenches in front of our lines (in the mines); Tunnelling Companies for mining; Land Drainage Companies to deal with the waterlogged trenches; Boring Companies for water supply; special works parks for Camouflage; special Companies for Gas, and very many others.

10. I have now disposed of the second result on military opinion, and now come to the discussion of the effects of the War on the science itself. This is most easily followed by reference to the new Manual of F.E., and by comparing it with the edition of 1911.

IV. The Changes effected in Field Engineering by the War.

1. When I was first detailed to compile the new manual, I asked what functions the work was to fulfil.

I was told it was to be the text-book for Woolwich, Sandhurst, Staff College, Army generally, Territorial Engineers and Colonial Forces. This was a very large order, and involved the inclusion of a great deal of elementary detail, as well as indications of the higher forms of engineering.

2. In the preface it is stated that Field Engineering does not only mean Field Fortification; there are many other kinds of engineering work performed in the field.

So the contents of the book have been grouped under what are considered to be the main branches of Field Engineering, and these are :—

(i) Field Fortifications.
(ii) Bridging.
(iii) Accommodation.
(iv) Communications.
(v) Demolitions.

Let us now examine the development of each of these subjects under the influence of war.

(i) Field Fortifications.

1. The term "Field Fortifications" brings to one's mind at once the defence of a position, a subject of absorbing interest to all Engineers; but since it implies the state of being on the Defensive as opposed to the Offensive, by which alone decisive results can be attained, it did not, before the War, receive the detailed study from the Army generally which was its due.

2. In the attack it was held to be a principle that all tactical points of value captured from an enemy must be *fortified*—or, as we learned to call it from the French, *consolidated*—against re-capture by the counter-attack. The soundness of this principle was abundantly proved during the war; neglect of it nearly always resulted in primary success being turned into defeat.

3. As applied to the defence of a position, Field Fortification is a wider subject, and the effect of the War on it requires detailed examination.

4. Before the War only those officers who had seen the final stages of the Russo-Japanese and the Balkan Wars had any experience of a defensive position several miles in length taken up and held by a very large force.

5. Our Manœuvre experience at home was limited to a position taken up for, say, two Divisions, the words being indicated by tracing tapes. This was altogether too imaginative an affair to convey any meaning to any one but the chief directors, and the time for the execution of the work was limited to about 48 hours.

6. The teaching laid down in M.F.E., 1911, was followed, the principles being that Field Fortifications in Defence should be used to enable the Defender to hold a position with the minimum number of men so as to release the maximum number to form a mobile reserve available for the counterstroke, after the enemy had been broken and become disorganised by the troops holding the defensive works.

7. The organisation of a defensive position was a series of fortified areas, strongholds or *points d'appui* as they were termed, placed at such a distance apart as to be mutually supporting and, at the same time, able to sweep the intervals effectively. These *points d'appui* were never larger than two Company (pre-war strength) posts, and were consequently small in area. The works of a position were arranged to lie roughly in one line or zone.

8. Advanced posts on certain important features which were too far from the line to be included, and too important to be neglected, were permitted, but there is no mention of successive lines of defence as we saw them in France. Curiously enough, there is in the pre-war manual an instruction to the direct contrary which reads: "There must be no idea of using trenches arranged in depth as successive lines of

defence." The German manuals also said : " One line and a strong one." The term " zone " is certainly used, but from the context, pictures and practice of the period, I do not believe that the three-line systems we used in France were in any way anticipated. Local Reserves were placed in convenient ground behind the " zone "—in the open, not in trenches. General Reserves somewhere in rear of them, also in the open.

9. It would appear, therefore, that the general idea running through the subject was a battle based on the experience of our manœuvres—that is, with the British Army of about two corps fighting a battle of, say, three or four days.

10. That this teaching was correct so far as it went was proved during the Battle of Ypres, 1914, where small groups of trenches held by determined men stopped and disorganised the enemy's troops, which were afterwards most faithfully dealt with by the handful of men who, though in no sense a reserve, had been collected from anywhere at all to deliver a counter-attack, and the situation, desperate as it was, was restored time after time.

11. If this teaching was correct, what was the influence that converted our system of strongholds with intervals for counter-attack into the construction of those continuous lines of defence which ran from the North Sea to Switzerland?

12. Though we had stopped the enemy's infantry advances, he possessed artillery in such numbers and of such power as had never entered our pre-war calculations. He could, at will, destroy any given section or group of trenches and bombard areas with such intensity that even if all the troops in occupation of them were not destroyed, they were rendered incapable of resistance. His artillery rendered the provision of alternative positions for the infantry imperative. His machine gun and snipers enforced the provision of covered communications.

13. As a result of the heavy casualties sustained, by which the original Expeditionary Force had almost been obliterated, the standard of training of the troops after the First Battle of Ypres had, as I have said, declined, and the strain of having to hold isolated posts was considered to be too great for the majority of troops.

14. For these reasons that wonderful line known as the Western Front was gradually developed, with its mazes of front, support, reserve and communication trenches, and behind them other systems of the same nature, all of which were intended for a step by step defence—quite at variance with the instructions of the pre-war Manual. Field defences for a field operation thus developed into siege works for a siege on a scale never before contemplated, and this was the principle which controlled the construction of all other systems of trenches.

Opinions still differ as to whether a position is best held by strongholds or continuous trenches The former is more rapidly completed

and involves less labour; but unless the areas are large they can be annihilated in succession by artillery, bombs from aeroplanes, &c. It is all a question of time, I think, and there is little doubt that a combination of the two principles is the best where strongholds are merged into or constructed within trench systems; the principle of defended areas is thus maintained with the advantage that they lose their conspicuity, and further, gain protection by spreading out the target offered.

15. Based on the experience of the war, the new edition of the Manual of Field Engineering describes a defensive position as existing of two parts .—

1. The Outpost Zone.
2. The Battle Position.

Each part is to consist of a series of strongholds or trenches organised into three lines :—

Front
Support.
Reserve.

The front line of the outpost zone will be usually the high water mark gained in a successful attack. This zone will be developed to the rear by degrees.

The Battle Position is organised on specially selected ground where work can be done more or less free from interruption by the enemy, and it will therefore be fitted with every modern convenience. Further systems in rear will be developed under even more favourable circumstances, to cover important strategical points or *communications*.

16. We can now compare the teaching of 1911 with that of 1921. The single line defence of 1914 has been expanded into two or more zones consisting of three sets of trenches or localities. The teaching of 1911 as to the construction of each of these lines is generally correct at the present time, but in 1914 our vision was too restricted. We thought in thousands of men instead of millions, in hours of battle and not in years.

17. Now let us examine the more important stages in the construction of a defensive system. They are as follows :—

1. Siting the trenches or works.
2. Order of priority of the work of construction.
3. Design of the trenches or defended areas.

Siting the Trenches.

18. Before the war there were two schools of thought which respectively advocated the forward slope and the retired position for the trenches. But the war made one definite condition : that whatever line was taken up, observation from it for the artillery was essential.

19. In an encounter battle where trenches are dug at the moment and the element of surprise is possible for a limited time, there is much

to be said in favour of the retired line; but where operations are to be of long duration, and aeroplanes are available to photograph the position, observation for the artillery is the first consideration, and that implies that the front trench, as a rule, must be on the forward slopes.

20. The retired position finds little favour with those who have to occupy the trenches, for, sooner or later, they will find themselves overlooked by the enemy. Trenches on the reverse slopes are the best to live in.

Priority of Work.

21. The change in order of priority of work is indicated in the following lines :—

1914. *First, clear* your field of fire.
Second, excavation (fire trenches).
Third, entanglements with wire.
Fourth, communication (trenches).

1918. *First,* you *choose* your field of fire.
Second, site machine guns well.
Third, entanglements with wire.
Fourth, the trenches, dig like H . . uns.

You will notice that clearing the field of fire is now almost obsolete—the work entailed is so heavy that it is much better to choose the best available field of fire and leave it at that, and this must be done in co-operation with the gunner and machine gunner.

The second line brings to notice the supreme importance of machine guns. They really form the framework upon which the whole zone of defence is built.

Entanglements come next, for they are constructed to suit the machine gun defence, rather than the lay out of the trenches themselves.

The trenches or digging work come last, and the Hun is taken for the example of industry. But in positions for which there is ample time to prepare, the work which takes longest should be put in hand first, *e.g.*, dug-outs; this was the practice of the Germans in the construction of the Hindenburg line, for we found in incomplete sections the order of priority was undoubtedly dug-outs, machine guns, wire, trenches.

Design of Trenches and Works.

22. Having traced the changes in the laying out of the position we will next examine the changes in design of the works.

23. The design of the trenches went through many phases. We began with the recessed and traversed trench with traverses 5 ft. thick and 4 ft. long, and trenches 3 ft. to 4 ft. 6 in. wide and 3 ft. to 5 ft. 6 ins. deep, and fire bays 12 ft. to 15 ft. long.

24. The intensity of artillery and machine gun fire induced some officers at the commencement of the campaign to reduce the width of

the trenches to such a degree that it was impossible to pass along them to superintend the men, so passages for superintendence were cut behind and connected with the fire trenches at intervals.

The high explosive shell destroyed both fire and superintendence trenches simultaneously, and the result was that twice as much work was necessary to repair them as to renovate a single and wider trench.

25. After all varieties had been tried, the final opinion was that the section of trench laid down in 1914 was suitable for trenches in the front systems, but that the plan had to be modified in the following particulars :—

Traverses were made 15 ft. wide and 12 ft. long.
Fire bays 30 ft. long with fire step for 6 to 8 men.
Width of trench, 3 ft. to 7 ft. 6 in.
Depth of trench, 5 ft. to 5 ft. 6 in. so that with an 18 in. parapet there was at least 6 ft. 6 in. of cover.

26. The trace of the trench was either key pattern, with traverses perpendicular to the line of the parapet; bastion, with the traverses set obliquely to the parapet; or zigzag. The latter was the quickest to lay out and dig. The design of the trench was as simple as possible, to make repairs easy.

27. The following changes and developments are also important :—

(i) Head cover and loopholes were only provided for snipers and observation posts, and were most jealously reserved for their special purposes.

(ii) Overhead cover and continuous loopholes were not constructed, for they were useless against H.E. shell, and their destruction blocked the trench and impeded repairs.

(iii) Elbow rests were abolished.

(iv) As regards the general lines on which defended areas were constructed, instead of being islands of groups of trenches self-contained, they became portions of the trench systems, thus giving better protection by losing their identity and by spreading out the target; they were also carefully organised for step by step defence, so that the enemy had to fight his way from trench to trench until he had won the complete group if he wished to be master of the position. The area of such groups varied, but from being from 20 to 30 yds. in diameter in 1914 they became some hundreds of yards square in 1918.

(v) The absolute necessity for drainage; the provision of duckboards at the bottom, and rivetting of the sides by ready made material, such as " A " frames.

(vi) The introduction of concrete into front line work, especially by creating inside or below a wrecked building a bomb-proof shelter for machine guns or troops.

Machine Gun Emplacements.

28. The supreme importance of siting machine guns has already been mentioned. To secure the greatest efficiency for these weapons there must be concealment for the gun and protection for the crew, possibly also for the gun.

29. The selection of the best site for the machine gun is an art of the highest degree. Very often if guns are very cleverly sited, both conditions of concealment and protection are satisfied with little or no work; but the importance of the subject has been greatly enhanced by the war, and many patterns of both hasty and deliberate emplacements have been evolved; the best known among the latter are :—

(i) The Champagne emplacement, which is a deep dug-out for the crew, connected with the surface by two vertical shafts, at the head of which are emplacements for the guns.

(ii) The "Moir pill-box," which is a structure of concrete blocks, with a steel roof and revolving shutter resembling a mushroom. Both types are products of the war.

Obstacles.

30. As regards obstacles, the effect of the war was to confirm the use of barbed wire as the most effective obstacle for all purposes.

31. Besides the sealed pattern wire entanglements of the high and low variety, collapsible and portable sections were made up complete to meet the demand for rapid construction. The importance of rapid and silent work at night was so great that wire entanglement drill was evolved and formed part of every field engineering training course.

A new article of store was introduced to aid silent work—the screw picket—an invention of the German.

In retired positions the German entanglements were sometimes 100 yards wide, and have been described as fox coverts on the hill sides. These entanglements induced the birth of the tank. Inundations played an important *rôle* on the Belgian front. After the original flooding by opening the sluices, the level of the water was maintained by two pumps yielding a million gallons a day installed on the Canal.

32. The problem of destruction of wire entanglements, which was being studied before the war, confronted the troops as soon as trench warfare commenced. Many solutions were attempted: cutting by hand or by made up demolition charges (*e.g.*, Bangalore torpedoes, Crokodil Schneider), machine gun fire, shrapnel fire, and H.E. shell; none of these were really satisfactory, until the invention of the 106 fuze, which was used with unlimited supply of artillery ammunition. For raiding purposes, where secrecy and surprise were essential, the Bangalore torpedo, which was invented by Major, now Colonel, R. L. McClintock in 1912, was popular to the end. The Bangalore torpedo is an explosive charge made

up in a long tube the length of which is equal to the width of the obstacle —on being fired it cuts a passage for its entire length. In future, tanks will play an important part in the destruction of obstacles of all sorts.

Tanks.

33. The introduction of tanks to defeat super entanglements and machine guns called for the invention of special obstacles to check them. Of these, land mines are the most likely to be successful, for they can be laid quickly, and if the position is carefully recorded they should be easy for our own tanks to avoid; but they have the disadvantages of minefields at sea—they constitute a danger for friend as well as foe. Tank ditches were dug in certain back area defences, but as a rule the labour of making them is prohibitive. There is, in fact, no satisfactory simple obstacle that will stop a tank, except the direct hit by a shell.

Crater Fighting.

34. On mining fronts craters were formed, and these created the necessity for crater fighting and crater defences. Quite a novel form of fighting, and one that we took to less readily than the Germans, and to the very end I think I can say from personal inspection, that their work in this respect was much better than ours. It is necessary to occupy the lip of the crater to prevent the enemy from obtaining the observation which the increased height would give him. The front of the crater lip must be protected by mines underneath it.

Poison Gas.

35. The invention of poison gas rendered special protection of dug-outs necessary. This was effected by means of specially designed gas-proof curtains. Gas also exercised a tremendous effect on the defence of woods, for the trees and buildings held the gas cloud and rendered the wood untenable. Latterly woods with any semblance of being woods were not held by trenches within them.

Sapping.

36. Sapping, a form of work exclusively the work of the sapper till the late war, was developed to a great extent on all fronts by the infantry.

Russian Saps.

37. Russian saps, which are tunnels a few feet only under the surface, were used in a way not mentioned before in history, as far as I know. They were initiated on the Somme battle front for the purpose of rapidly connecting up our front line with that of the enemy after the successful assault. In the preparations for the battle the tunnels were run out as

close as possible to the enemy's line. Machine gun and Stokes's mortar emplacements were placed at the end of them, and these were disclosed at the last moment and joined in the general attack so as to prevent the enemy from manning his parapets while the infantry were advancing over " No Man's Land."

38. As soon as the first wave had passed over the front German trenches a working party connected up the head of each sap with the German trench either by digging or blowing a bored mine—another innovation—which was the quickest way. The tunnel was then opened up and provided a communication trench across " No Man's Land."

39. This method had such success that it was developed in a wonderful degree for the Battle of Arras and the Vimy Ridge.

40. On that occasion it was actually possible to walk in one continuous tunnel from the centre of Arras to the German front line without coming to the surface, a distance of about 2½ miles. In other tunnels troops passed from the support line into " No Man's Land " *under* the German barrage and captured their objective without suffering loss from it.

41. The usual dimensions of a tunnel were 6 ft. 6 ins. high and 3 ft. 6 ins. wide, to allow of two men in full war kit passing.

42. This development of Russian saps was a product of the war.

Camouflage.

43. Of all the new ideas impressed into the scope of field engineering camouflage is perhaps one of the most interesting. It is the act of concealing that something is being concealed. It is not hiding—hiding is accomplished by screening, quite a different thing.

44. For instance, a kilometre stone on the side of a public road is in a desirable place for an O.P. It is close to the enemy line and therefore valuable. One night the stone is removed and replaced by an exact replica in steel with a concealed loophole for observation. The enemy being used to the sight of the stone does not notice the deception.

45. Similarly a well known tree-stump, from the top of which a view over dead ground can be obtained, is cut down and replaced *in one night* by a replica which is in reality a steel conning tower. If the replica is cleverly made the deception is not recognised until a chance shell strikes the dummy tree.

46. This art was most commonly used in the concealment of guns, tanks, &c., and tracks which would otherwise give away a frequented house or shelter which had much traffic to and from it, *e.g.*, a Divisional Headquarters.

47. Chinese attacks were rendered possible by the artistic skill of the personnel employed on camouflage; lifelike figures in all sorts of military positions of infantry advancing were erected at night in " No Man's Land." In the half-light of early dawn they had the effect

of alarming the enemy, and perhaps inducing him to put down a barrage on unoccupied trenches purposely left unoccupied, and thereby disclosing his own artillery intentions.

(ii) Bridging.

1. Before the war, the Army had been trained in a certain degree to make barrel-pier rafts and bridges; bridges with spars and lashing, and bridging expedients. Of all these, bridging expedients was the only class that came into use—and that only in a minor way.

2. Spars and lashings were proved to be obsolete, and have disappeared as bridging mediums, except as practice to show what a trestle bridge is like. The lock and sling bridges are now obsolete.

3. The serious bridging was the privilege of the R.E., and this was developed in such a remarkable manner that it is worth while to note what the changes were.

4. Before the war the field companies carried with them pontoons and standard trestles, and each field company could build a bridge 45 ft. span over a stream, or over a dry gap not deeper than 6 ft. to 8 ft. By collecting the equipment of several companies, a bridge could be made which was capable of taking single loaded lorries over still water or a very sluggish stream.

5. During the long waiting for the victorious advance, standard steel bridges of various spans, and capable of carrying various loads, were designed, made, and sent to France, so that when the advance did take place in 1918, bridges of all sorts were available to bridge the gaps made by the Germans to hinder pursuit.

6. The feature of these bridges was that for each class the parts were interchangeable, and the limiting weight of each part was such that it could be manhandled and carried in a lorry.

7. The development of the campaign proved that, though the pre-war bridging equipments might be good enough to ensure the passage of the assaulting troops over the obstacles in their immediate front, the demand for immediate supplies of food and ammunition to enable them to maintain their positions, and to continue their advance, rendered it imperative that bridges to carry lorries should be available within 24 hours of zero. Thus it was that immediately after the troops had gone forward, lorry bridges were built, frequently under fire, provided from the stores which had been accumulated during the years of waiting.

8. These bridges were from 20 ft. to 180 ft. span, and were designed to carry loads varying from lorries to tanks.

9. The biggest bridge of this type built during the campaign was one of 180 ft. span over a gap 93 ft. deep in the Canal du Nord near Havrincourt. This bridge carried lorries, and it was said to be capable of carrying tanks when it was stiffened, but it was never so used. It was built in

parts, none of which was heavier than 30 cwts. It was commenced under shell fire and was bombed during construction.

10. It may be claimed that, as a field engineering job, the bridge over the Canal du Nord was an important development from the pontoon and Weldon or Service trestle equipment we started with.

11. Crossings for tanks were constructed in other ways than bridges. Causeways were made over canals—tank jumps over streams not more than 10 ft. wide; but one of the most cunning ideas was a crossing which was composed of a series of buttresses built at convenient intervals across a stream—the top of the buttresses were finished off a few inches *below* the surface. The buttresses did not show on an air photo, so that the crossing place was unsuspected. At the appointed time, the buttresses acted as stepping stones for the tanks which crossed successfully, and, being unexpected, were a special source of terror to the enemy.

12. Light bridges, of which the floating piers were crates of cork, were successfully used on many waterways, but in no position were they so important as over the river at Nieuport. Here for months the only communication between Nieuport and our advanced trenches were two bridges of this design. Their advantages are that they are difficult to destroy by shell fire, and they are easy to repair if destroyed.

(iii) Accommodation.

1. *Camping Arrangements.*—The campaign began with bivouacs and billets, but as time went on more permanent arrangements were necessary. For men at rest, huts of all sorts were provided, the most noticeable type being the Nissen Hut, which is a structure of steel framing, with corrugated iron covering and lined with wood, to give accommodation to about 20 men. In shape it resembles a semi-circular tunnel. The characteristic of this form of hut was that it was light for transport, easily portable and could be erected and taken down by unskilled labour. It was made in two sizes, and could fill any requirements, from a barrack room to a cinema hall, according to the span of the curve of the roof and the height of the walls.

2. *Water Supply* was nearly always a very, very difficult matter, the sub-soil water being, as a rule, polluted, and deep well boring was a common operation, often carried out close up to the front line, or, during the advance, just behind the leading troops.

3. The boring plants were so near to the front that they were frequently shelled and bombed while being worked. The depth of wells was anything up to 700 ft.; 470 bores were put down. This was quite a new departure in field engineering during operations.

4. In many cases the water supply pipes were actually brought up to the troops in the support trenches. In the Russian saps for the Vimy Ridge Battle water was laid on from the main line.

5. Two large underground tanks were tunnelled out in chalk, and lined with tarpaulins, close up to the front line for the Vimy Ridge Battle. At Neuville St. Vaast and throughout the campaign and during the advance, the construction of water points for men and horses was one of the most important duties of the R.E., in which tanks made of tarpaulins always had a prominent place.

6. Demands for greater comfort and considerations of health for the men at rest resulted in a generous supply of baths, and washing facilities, and *hot* water. Bunks in barns and farm buildings, and oiled paper windows, to admit of daylight into what were otherwise merely dark storage buildings.

7. *Sanitation* was brought to a high level whenever possible, and fly-proof food receptacles and latrines were provided as well; also incinerators and destructors, disinfectors, laundries, &c., and special plants for sterilising water in bulk.

Dug-outs.

8. The constant and heavy artillery fire necessitated the provision of safe accommodation in and behind the trenches.

9. The enemy were certainly the pioneers in the art of making dug-outs.

10. In our pre-war teaching we had never contemplated anything more serious than a shrapnel-proof overhead cover.

11. Dug-outs were constructed of two types :—

(i) the light one for protection against weather and light shells, say up to 4 in.
(ii) The shell-proof one to give complete protection against shells of all calibres.

12. The experience of the campaign proved that a dug-out with more protection than (i) and less than (ii) resulted in the occupants being buried and killed before they could be rescued.

13. The safe limits of depth of cover for a shell-proof dug-out were :—

Clay	30 ft.
Chalk and clay mixed...	25 ,,
Chalk	20 ,,

14. The dug-outs at first had to be made by the R.E., but later on, as stated, many other arms were trained, and made their own very well.

15. The Nissen Hut for shelter from weather had its counterpart in the steel shelters for protection against fire, which were curved sheets of corrugated steel of two dimensions, known as Elephants and Baby Elephants. They usually formed the inside skins of a concrete shelter.

They were also used underground. These were a product of the war, first made in Germany.

16. The demand for dug-outs for protection of troops after the Battle of the Somme, and when we followed the Germans on their retreat to the Hindenburg Line through the devastated area in 1917, may be judged from the fact that dug-outs were made during the winter 1917–18 by the tunnelling companies alone, for 20,000 all ranks. Many other dug-outs were made besides these. Anyone who had knowledge of the work will understand the labour involved.

17. The development of dug-outs was a remarkable addition of the work of field engineering. It is worth noting that among all ranks there is a distinct aversion to going underground. In my experience the only men who really preferred being underground to being on top were the miners.

(iv) Communications.

1. Road-making was not a subject very closely studied before the war by the army as a whole, and even the engineers had not had much experience in keeping up roads under really heavy traffic. The South African War afforded no special need for this study, though there were many dangerous roads. Still, the traffic was never in any way comparable to what we had to meet in France.

2. The importance of everyone knowing how to make a road is evident, but the experience of those in charge of working parties reveals the total ignorance of most men of the subject, and yet such work is done under their eyes all their lives wherever they are.

3. The duckboard and slab road, an improvement on the American Corduroy road, were the two most noticeable products of the war, but neither can claim to be an invention in engineering; they find a place, however, in the new Manual.

4. Light railways, tramways, ropeways, mono-rails and even a mud-boat were used in the effort to supply the men in the front with food and ammunition, and to reduce the labour of carrying.

5. The mud-boat was an invention of Lt.-Colonel Nissen, of hut fame. It was a barge fitted with a small oil engine, which revolved a drum on which two or three turns of a chain cable were taken. The forward end of the chain was anchored. The boat warped its way over mud, sloughs, shell holes, &c. Even this had its counterpart in the chain ferry, but it is an innovation in field engineering on land.

6. The use of wire netting in making roads in sandy deserts was developed in Palestine and Egypt in a remarkable way. By this means heavy mechanical transport was enabled to traverse country which otherwise was quite impassable. The feeling of relief in suddenly finding one's feet on a wire netting path after ploughing through soft sand ankle deep, must be experienced to be appreciated.

(v) Demolitions.

As stated at the beginning of the lecture, the Army had to make itself familiar with explosives, and though there is not much change in the methods of demolition it is now necessary for the Army to read that part of the book and not think it is for R.E. consumption only.

Guncotton still remains the staple explosive for hasty demolitions; ammonal, amatol, and blastine for any other sort of work. In the work of demolition it is laid down in our books that the calculated charges should be increased by 50 per cent. in the face of the enemy. I do not know what our practice was in the retreat of March, 1918, but I know the German in his retreat thought it was safer to add 200 per cent., judging from the relics he left behind of what used to be bridges. His wholesale destruction of villages by deliberate demolition, and roads and water supply by mines, should also be noted for future guidance.

Land Mines, Man Traps, and Spring Guns.

Man traps, spring guns, &c., have found a place in every war. The Germans were artists in this kind of business, and from them we learnt to be careful. The art of finding, rendering safe, and removal of these contrivances, is one which is born in a man, and requires great courage.

The delay action mine of the German was the novelty of the war; the length of time depended upon the strength of the acid which ate through the wire holding back the trigger which fired the charge. Some of them went off four months after setting. We were prepared with a device which could be set to go off at a 14-day interval, but it was never necessary, and therefore never used.

(vi) Mining.

The more technical nature of demolitions is mining. After the early part of 1915 this was carried out by R.E., assisted by infantry working parties.

When mining was at its height there were at one time as many as 24,000 men employed on the Western Front on underground work.

From this it will be seen that mining involves a tremendous drain on the strength of the infantry units.

Offensive mining directed to gratify local dislikes, such as enemy machine gun posts or observation posts, or to celebrate public or individual anniversaries, such as the Brigadier's birthday, merely provoked retaliation and converted what may have been a quiet sector into one of extreme mining activity out of all proportion to the importance of the sector.

In order to limit the number of men employed on mining, the following principles were laid down :—

All mining was controlled from G.H.Q.

No offensive mining was permitted unless it was intended to play

an important part in an operation on the surface; subject to this condition, mining was limited to the defensive, and restricted as far as possible.

1. The more technical branch of the art of demolition is military mining. This was delegated almost entirely to the R.E.

2. Its development during the years 1914–17 was almost as remarkable as that of military bridging, as the following details will show.

3. In 1914–15 the average depth of our mines was 30 ft. and from Ypres–Givenchy, this meant we were working in wet and very difficult ground. The galleries were not more than a few hundred feet long; the charges were from a few hundred to 2,500 lbs.

The average dimensions of our galleries were 4 ft. 6 ins. by 2 ft. 3 ins. Australians and New Zealanders preferred a larger size, 6 ft. by 3 ft. The rate of progress varied from 8 ft. to 15 ft. a day. We were quicker than the Germans.

4. In mining, there is a continual struggle to get below your adversary, and so the mines gradually grew deeper, and the charges became, of course, greater.

5. At the final stage reached for the Messines Ridge Battle, the deepest mine was 120 ft. deep. The largest charge was 96,000 lbs. The largest crater was 285 ft. in diameter and 86 ft. deep, and the longest gallery was 700 yards.

6. In connection with mining, the science of listening underground was developed, and specially trained men could be trusted to give accurate reports of the actions of the enemy mining, the distance and direction up to 60 or 70 ft. in clay.

When we commenced mining it was thought that nothing could be heard through clay at a greater distance than 15 ft.

7. Military mining is inseparable from the science of geology, though we did not recognise this at first. The Geologist attached to the mining staff was frequently able to give such information as led to most valuable results.

8. For instance, mining in chalk *without* geological knowledge we sank a system of mines below the subsoil water-level in winter. The water rose to its high level and our mines were flooded, and we lost a valuable section of mines for nearly three months. Fortunately, the German, who was higher and was not flooded out, did not take advantage of our quandary. With geological advice such an occurrence should be avoided.

9. Electric power for pumping and lighting was installed in several mine systems.

10. Tunnelling machines were tried, but were unsatisfactory, except as regards bored mines.

These have been mentioned before and the following is a brief description. These mines were made by two kinds of machines: the Boring Machine and the Push Pipe.

The boring plant resembles a boring plant for a well, with the difference that the bore is made horizontally and not vertically. The bore is from 4 ins. to 6 ins. diameter, and is lined with steel tubes. If the bore is required to make a breech it must be set about 10 ft. below the surface.

The bore is then loaded for its entire length with explosive, and when fired the result is an elongated crater which can be converted into a covered way for troops.

A maximum of 300 ft. was aimed at in experiment, but in actual practice I think only about 150 ft. was ever obtained.

Once this system was used by us to fire a mine we had lost by being flooded out. We bored from a high level into our flooded mine chamber —which was, of course, loaded—and it exploded a charge at the end of the tube which, in turn, fired the mine charged, with very satisfactory results for us.

The Push Pipe was a pipe pushed hydraulically through the ground. It was useful only in ground free from stones.

DISCUSSION.

MAJOR-GENERAL SIR GEORGE SCOTT-MONCRIEFF, K.C.B., K.C.M.G., C.I.E.: I think the lecturer has in the time at his disposal covered most of the salient points which the war has brought forward in connection with field engineering. I have listened to him with great pleasure, the more so because he and I were connected together in various matters for so many years. I think, however, he has hardly done justice to the training of the infantry and cavalry before the war. There has been an enormous advance, especially since the South African War, in this respect. It was not merely in the elementary trench work, bridging and a few other things of that sort, that the infantry and cavalry regiments showed progress, but in matters which, prior to that period, had been considered the speciality of the Royal Engineers, such as overhead cover, heavy bridging and other matters, which showed the interest and the zeal of the various arms concerned. In the units the progress varied. There were some regiments in which the commanding officers took a great deal of interest in the question and where, naturally, the progress made was very much greater than in others. The lecturer has also, I think rightly, stigmatised as preposterous the two-guinea hand grenades, the cost of which really made it impossible for training to be carried out in that particular branch. It may be news, however, to some here to know that during the period of Sir Horace Smith Dorrien's command at Aldershot an attempt was made in the Second Division to train the field companies with extemporised hand grenades and also with trench mortars. Those were probably not a bit superior to the jam tin grenade which Colonel Harvey has spoken about, but they were certainly an attempt to solve the problem which had been evident to the minds of men who had been thinking out the subject. The Commander-in-Chief himself took the greatest possible interest in it, and was desirous to see it extended in the Command. But the reports which were made to the War Office on the subject brought down such a shower of maledictions that we were obliged to drop the whole matter, and nothing further was done until, during the war, it was found that in this respect we were singularly behindhand. Then again the lecturer pointed out how only two companies of engineers were with each Division at the

outset. The Kitchener Committee of 1911 had recommended three. That was never turned down by the Army Council, but nothing was done in the matter. Consequently the Expeditionary Force went out with two, and it was very speedily found that those two companies were insufficient. The vacancies were filled, as Colonel Harvey has stated, by Territorial companies and also by certain other companies of engineers gathered together from various fortresses. But it was unsatisfactory and one cannot help feeling that if the recommendation of the 1911 Committee had been carried out we should not have been in the difficult position we were in during the fighting at Ypres. Then, again, the lecturer has stated how in our staff tours and manœuvres the subject was not considered as it might have been, and I think that is true. I think also the fact that in an ordinary civilised country the towns and villages present a good many points of possible value in connection with field engineering has been very largely lost sight of. I remember one staff tour, in which Colonel Harvey took part with myself, in which the resources of the country in this respect were to some extent investigated, and I think we were all impressed with the fact that the officers who took part in it had very little experience and knew very little about how to make use of those resources. In going on to consider the expansion of the technical part of the Army by means of pioneers, I was very much interested to hear what the lecturer said about their value, for it was on my suggestion that Lord Kitchener agreed to have a battalion of pioneers with each Division. My experience in India, where I at one time was staff officer of a Brigade of Pioneers, had convinced me that, if you give infantry battalions some extra equipment and a little extra training and tell them that they are to be specialists in the subject of field engineering, they will take to this subject with great avidity. Certainly this experience was true in connection with the pioneers of the various Divisions in the field. But it was not intended that they should be an extra infantry battalion, placed at the disposal of the Divisional Commander for such infantry purposes as he might wish, but rather that they were placed at his disposal for the carrying out of field engineering on a larger scale than would be possible with the limited number of engineers available. Then as regards the change in the priority of work, one of the most interesting parts of the lecture was the way in which the stern experience of war and the practice of our enemies showed us that the first thing was to get the machine guns and the wire entanglements in position and then to construct the trenches afterwards. On the few occasions on which I had an opportunity during the war of seeing the work of the enemy, I was very much struck with that fact. When the Germans retired in 1917, leaving some of their work unfinished that was one of the points which struck one very forcibly in connection with their field entrenchments. I should like to say, with regard to water supply, that the experience of the war has shown that military water supply is now as distinct a branch of field engineering as military bridges have always been considered to be. The advance in connection with the solving of these problems during the war was very extraordinary. Nothing could be more different, as far as the *terrain* is concerned, than the Sinai Peninsula, the Somme battlefield and the Belgian front, and yet in each of these, treated entirely separately and differently, the problem was successfully solved. I think it is hardly necessary to say that there must be the very closest co-operation between the General Staff and the engineers in connection with this subject, because obviously the proposals of the General Staff as regards operations must affect the water supply, and the earliest intimation must be given to the engineers in order that they may have time to effect their arrangements and be ready to meet the demands of the General Staff in connection with such operations. Of course, it is perfectly true that unforeseen developments

occur which necessitate the movement of troops not originally contemplated, and for that purpose the engineers must necessarily make a liberal allowance, as was done at the time of the Somme operations. But at the same time it is necessary —and I feel sure it will be recognised—that the closest co-operation is required so that this vital supply will be ready in time and in ample quantity. I think also that, although, broadly speaking, the subject of water supply is an engineer's business, all troops should be trained, and can be trained, in the construction of watering points and of horse-watering points. We know from experience how troublesome these may be if they are not properly constructed, and the number that require to be built with a modern Army necessitates, I think, some training in the subject for all branches, so that they may know how best to do it and what errors to avoid. Then, finally, I should like to say a word about the subject of mechanical mining. Mechanical miners were tried and were found a failure. Again and again I may say at home we thought we had solved the problem. It was within an ace of being successfully solved again and again. I hope that this matter will not be allowed to drop, and I trust that the problem of mechancial miners will be solved by our mechanical engineers in this country, just as the problem of tanks was solved. After the first fighting that occurred we were asked to supply some sort of mechanically propelled shield which would deal with wire entanglements and machine gun emplacements, and something like ten months after the problem was put before us the tank was evolved in co-operation with the Navy. I feel sure that if the best mechanical brains are put to work to solve this question of mechanical mining an equally satisfactory result will eventually be attained.

MAJOR-GENERAL SIR CECIL E. PEREIRA, K.C.B.: I have only one remark to make, namely, that I should like to see every infantry officer go to Chatham for a short course and get a Chatham certificate in the same way that every infantry officer gets his Hythe certificate. The course at Hythe for the infantry officer raised our musketry practice far ahead of that of the Germans, and if a similar system had been in vogue before the war in regard to the training at Chatham the same thing would probably have occurred in connection with engineering. As a matter of fact, however, the engineering of our infantry was behind that of the Germans and remained so all through the war.

BRIGADIER-GENERAL J. E. EDMONDS, C.B., C.M.G.: I think it is fair to say that, although the Germans were ahead of us at the beginning of the War so far as field engineering was concerned, we gradually caught them up and then passed them, except, perhaps, in the art of making concrete machine-gun emplacements, and, as we always had our eye on the offensive and did not consider the defensive so much, I think that was the only reason why we did not surpass them in that respect. I think it might also be said that our Army ought to have followed more closely in peace time what the Germans were doing. The Germans were ahead of us because they thought things out. They not only practised field fortification but studied the attack of fortified positions, particularly the accelerated attack of fortresses. All this was perfectly well known to us; our officers were permitted to attend their manœuvres. I myself attended manœuvres at which what we now call trench warfare was practised, and an account of those manœuvres was printed. But in spite of the lessons of the Russo-Japanese War and reports of German deductions therefrom little attention was paid to trench warfare in this country, and we made no preparations for it. I hope we shall continue to keep our eyes on the Germans now and watch their doings more closely than we did before the war.

COLONEL H. LEWIN, R.A.: The only point on which I should like to ask for guidance is one that I am afraid Colonel Harvey did not touch upon in his lecture, but it is one which I think may be considered as coming within the province of field engineering. At the end of the war in 1918 we were beginning to find that the Germans through their use of mustard gas in shells, which they were able to use in large quantities, and by the concentration of gun fire on certain localities, began to deny those localities to us. Owing to that fact, it was perfectly impossible for troops to occupy a carefully prepared fortified area at the moment when it was most wanted, because the whole ground had been saturated with mustard gas and was therefore untenable by the garrison detailed to hold it. Carefully prepared battery positions in one area with which I am acquainted had to be abandoned and the guns quickly moved out into the open before they could be used. The same thing happened in connection with certain infantry strong points. Luckily the change of site disarranged the German plans almost as much as it did ours, because they found themselves confronted with the problem that certain strong points which they had evidently made up their minds to attack were not held by us, and, as a matter of fact, in one small affair I particularly have in mind they did not make much headway. But there it was: areas which had been carefully prepared for defence were quite untenable and useless for defence when the moment came, owing to this concentration of mustard gas on them.

COLONEL H. E. T. KELLY: In connection with the defensive position, Colonel Harvey has referred to its division into the "outpost zone" and the "battle position." The expression "outpost zone" has given rise to a good deal of doubt in connection with the new Field Service Regulations. I submit that it would be very much better if it were called the "forward zone" and not the "outpost zone," because it has led to confusion between the ordinary protective outposts in moving warfare and this outpost zone. If you read the Field Service Regulations you will see that the requirements are rather different. I therefore submit that it would be very much better if the term "forward zone" in connection with the defensive position were made use of. Sir George Scott-Moncrieff has referred to the question of troops knowing more about the arrangements for water supply. I think during the war most of the artillery units managed to acquire, by some means or other, a pump and a portable water trough, and I think it would be a very good thing if it were recognised that we should be allowed those stores as part of our equipment. We could then look out for ourselves without bothering the R.E. as regards the watering of horses.

COLONEL R. N. HARVEY, C.B., C.M.G., D.S.O., in reply said: As regards Sir George Scott-Moncrieff's criticism of my statement in regard to the training of cavalry and infantry, I admit that my statement was sweeping, and it was meant to be sweeping, because I thought that if I did not make it so it would be passed over and nobody would notice it. I desired it to be brought forward that there was training in the cavalry and infantry to a certain degree beyond that to which I referred, and I made the remark on purpose in order to obtain the statement which Sir George Scott-Moncrieff has made to-day. With regard to the question of gas rendering positions untenable, I purposely left that question out of my lecture. I had to leave out a lot of things, and I left out gas because I do not know much about it, except that I do know that all positions in woods which had any resemblance to woods were not occupied at all, because it was impossible to clear gas from them. Villages, unless they were thoroughly wrecked, were never held for the same reason. When it came to mustard gas, that complicated matters more than ever, because the ground got impregnated with the mustard gas and it was

quite impossible to work in any area in which that gas had been applied liberally. As far as I know there is no answer to that, except, as the questioner stated, the abandonment of the position and trusting that the Germans themselves would find it too bad to occupy. As regards the expression "outpost zone," it is three years ago since I began the book, and I do not know what changes have happened since in the actual draft. The term "outpost zone" was derived from the fact, as I have stated in my lecture, that it would be the high-water mark of the successful operation which on the night of the attack would be the outpost line, and, if the operation stablished at the outpost line, would gradually develop into the outpost zone. I think that was the argument which led to the adoption of that term. I certainly admit that it is rather confusing to have that term, but I am now no longer interested in writing that book, so that I do not know whether the suggested revision will be carried out.

THE CHAIRMAN (LIEUT.-GENERAL SIR E. S. BULFIN, K.C.B., C.V.O.): Gentlemen, I think you will agree with me that we have listened to an extraordinarily interesting lecture, which has given rise to a certain amount of discussion, for which we are all the better. As Sir Cecil Pereira remarked, I have felt for a long time that we infantry ought to know much more about field engineering than we are taught. The correct manner, in my opinion, for the infantry officer to be taught it is at Sandhurst. I think more attention should be paid at Sandhurst to the question of teaching field engineering. We did try very hard before the war to learn a little about field engineering, but the general principle that we always had to keep in view and on which all work was based was the principle of attack, offensive, and anything in the way of defence was regarded with grave suspicion. I know that I, as a subaltern and captain, was always taught that if you put infantry into a trench it was the devil to get them out of it, and therefore that it was not a good thing to put them there if an attack was contemplated. I do not know whether that is right or not, but still that is what I was taught. I must say that when before the war I went down to Salisbury Plain to watch the gunners I was tremendously impressed by the tempests of fire of the artillery, and I determined that when I reached the proud position of commanding a Brigade I would teach my men to dig in rapidly if they were likely to have to remain for longer than ten minutes under artillery fire. The result of that was that I was held up to ridicule by my brother Brigadiers. I was told at Aldershot that I considered the spade of more importance than the rifle, which I never did, but that was their line of thought. In 1914 we held our lines through being able to make scrapings with the poor little implement with which we were supplied. Of course that implement was an excellent thing in its way, but it was not good enough for the trial that it was put to. I think we ought to get a better spade given to us, or that the spade should be further up so that it can be got at more easily. At the same time I do not think we should overburden the infantry soldier by putting much more on him. We keep putting things on him—steel helmets, gas masks, emergency rations and all sorts of things. Everything is piled on to the unfortunate foot soldier. It is a good thing that the war on the Western Front was not a rapidly moving campaign. In Palestine we had to abandon all these things, although they are very nice and useful. I think we ought to watch very carefully the equipment of the infantry and not allow all these things to be piled on to him and then expect him to do a decent march and a hard fight, because he cannot do it. The feet are only given us to bear a certain weight, which is the man's body, and to pile all these things on top of him and then expect him to win the battles of his country is asking too much. I hope therefore a good deal of thought will

be devoted to the subject before people start putting more things on this useful but unhappy man. I was extraordinarily interested in the remarks made by Sir George Scott-Moncrieff with regard to mechanical tunnelling, because we cannot get away from the fact that a new arm has appeared in aeroplanes. It seems to me that aeroplanes will run the guns very close in destructive power. I believe that such a great advance will be made in explosives by the various chemical schools that some most terrible forms of shells will be produced, and if these explosives are dropped from aeroplanes and the results observed it will be frightful. I believe that instead of digging trenches, we will burrow into the face of all the hills and poke our machine guns through the face, leaving no trace up above of where we are. I believe that future warfare will take some horrible forms like that, if the aeroplane develops on the lines that I believe are very likely to be adopted. Therefore one is relieved to hear of some mechanical form of tunnelling which we all dreamed of when we were out in France in the tunnelling days. When we were engaged on this tunnelling business we all hoped that some form of mechanical miner would be invented, and there is no doubt that with the nimbleness of mind possessed by the engineers in this country it is likely that something of that sort will be evolved. I was very glad to hear an authority like Sir George Scott-Moncrieff say that that was likely, because I believe it will be wanted. I believe that every one of our houses will have very large cellars, with 40 feet of earth above the top, into which we can go in case of air raids. In conclusion, I can only say that I think we owe a great debt of gratitude to Colonel Harvey for the vast amount of labour he has bestowed upon this lecture and for placing his great knowledge at our disposal. It has been an extraordinarily interesting lecture to me, as I am sure it has been to you, and on your behalf I thank Colonel Harvey most sincerely for his kindness in placing this most valuable material before us.

Lieut.-Colonel Sir Arthur Leetham, C.M.G. (Secretary of the Institution): Gentlemen, on behalf of the Council of the Institution I ask you to accord to our Chairman a hearty vote of thanks not only for presiding here to-day but also for his valuable remarks.

The resolution of thanks was carried by acclamation and the meeting terminated.

SOME REFLECTIONS ON THE CAVALRY CAMPAIGN IN PALESTINE.

By COLONEL COMMANDANT G. A. WEIR, C.M.G., D.S.O.,
Commanding 3rd Cavalry Brigade.

On Wednesday, 18th January, 1922, at 3 p.m.

LIEUT.-GENERAL SIR P. W. CHETWODE, Bart., K.C.B., K.C.M.G., D.S.O.
(Deputy Chief of the Imperial General Staff), in the Chair.

THE CHAIRMAN: Colonel Commandant Weir is going to talk to us about the operations of the mounted troops in the Palestine Campaign. He has had an almost unrivalled experience of mounted troops during his life, first of all in South Africa, then in peace time in many parts of the world, and finally in France and Flanders, and in really the only show the mounted troops had in the Great War—during Allenby's final advance in Palestine. I will say no more, but ask him to address you.

LECTURE.

1. I have called this lecture "Some Reflections on the Cavalry Campaign in Palestine" because it deals with the final phase of those operations in which Cavalry played the most dramatic part; and I hope, without attempting to follow the events in detail, to put before you certain aspects of the operations which seem to me of interest, and which may form a basis for "that reflection and comparison which are absolutely necessary to enable one to make sound deductions from experience."

2. To enable you to realise the conditions under which it took place, I will begin by showing you a series of photographs illustrating the various types of the country met with.

This is a map showing the main physical features and this black line marks approximately the positions of the opposing forces on 18th September, 1918, immediately before the great attack.

The principal features are the Hills of Moab, the Jordan Valley, the Judean Hills, the foot-hills, the maritime plain and the sand-dunes. This series of views gives you a very fair idea of the difficulties of the task which presented itself to Lord Allenby.

3. He had available 12,000 sabres, 57,000 rifles and 540 guns, whilst the enemy's fighting strength is estimated at 4,000 sabres, 32,000 rifles and 400 guns, giving him a preponderance of 3 to 1 in Cavalry, 7 to 4 in Infantry and 11 to 8 in guns. His infantry superiority was considerable, but no greater than that of the Allies over the Germans in France during the greater part of 1916–17; it was to his Cavalry that he had to look for decisive results.

4. He states in his despatch that his great superiority in Cavalry was the determining factor of his selection of his point of attack, and, although he was obliged to weaken himself elsewhere, he was apparently determined that his Cavalry should have a clear path made for them through the enemy's lines.

5. Here is a map showing his concentration for the attack, and you will notice that, while he concentrated 35,000 Infantry and 383 guns on a front of about 15 miles, held by the enemy with a force of 8,000 infantry and 130 guns, he left only 22,000 Infantry and 157 guns to hold the remaining 45 miles of front.

There was no reserve, every available man was pushed into the front line, even the Corps Cavalry, Pioneer Battalions and details from Reinforcement Camps being formed into Watson's Force and given a part of the front under the Twentieth Corps.

On this 15 mile front you will see that the salient only was attacked, so that the greatest possible depth could be given to the Infantry.

The Cavalry, 3 Divisions, were hidden in these orange groves.

6. I should now like to draw your attention to the tasks set to Corps, and the instructions issued.

The R.A.F. had already established air superiority during the period of concentration, and the chief task set it was to attack all the enemy H.Q., in the hope of destroying his communications, paying particular attention to hostile aerodromes so as to prevent his planes leaving the ground until the arrival of the Cavalry.

7. The task of the 21st Corps (5 divisions, one Mounted Brigade and the French Detachment) was to break through the enemy's defences between El Mughier and the sea; as soon as the line Et Tireh–Nahr Falik had been captured it was to wheel to its right and, advancing eastward, to drive the enemy from the line Deir Sheraf–Tul Keram, and be prepared to pursue the enemy in the direction of Jenin.

8. The 20th Corps was to attack astride the Nablus road and to be in a position to advance towards the high ground North and North-East of Nablus on the evening of the day on which the 21st Corps made its attack.

Chaytor's force was to be held in readiness to attack East of the Jordan on the receipt of orders.

Task of the Desert Mounted Corps: As soon as the crossings over the Nahr Falik and the marshes to the East have been cleared of the enemy by the advance of the 21st Corps, the Desert Mounted Corps,

passing round the left of the 21st Corps, will advance to Afule and Beisan to cut the enemy's railway communications, and to block his retreat in a North and North-East direction.

First objective the line Kakon–Tel Edh Dhrur.

To push on with the utmost speed to the Afule area.

Every effort must be made to prevent the escape of Turkish rolling stock by cutting the railway lines from Jenin and Haifa to Afule at the earliest possible moment.

Retaining sufficient troops in the Afule Jenin–Lejjun area to close the Turkish lines of retreat to the North and North-West, to push on to close the roads which converge on Beisan from the Jordan Valley and Nablus.

9. The special instructions issued to the Desert Mounted Corps lay stress on the following points :—

(*a*) On no account to allow troops to be drawn into the Infantry fight South of the Nahr Falik.

(*b*) Not to be diverted from main object by the presence of hostile troops in the Tul Keram–Et Tireh area.

(*c*) To cross the line of the Nahr Falik at the earliest possible moment, but advance not to interfere with the Infantry attack or mask the fire of the Corps Artillery.

(*d*) If the enemy retreat towards Haifa only sufficient troops to be detached to watch them, as large a force as possible to be placed across the enemy's communications about Afule and Beisan.

(*e*) The action of troops to be characterised by the greatest vigour and rapidity.

(*f*) From Afule a detachment to be sent to seize the bridges over the Jordan at Jisr Mejamie.

10. At a conference held at G.H.Q. on 11/9/18 the G.O.C., 21st Corps, asked that the Cavalry Corps should not pass North or East of the general line occupied by his artillery waggons until the Artillery moved forward. The Commander-in-Chief said that the G.O.C. Desert Mounted Corps was responsible that the Cavalry movements in no way hindered the progress of the 21st Corps attack and that he would lay down no other restrictions.

11. I have given you this summary because, apart from the fact that the instructions to the Cavalry appear to me to be a model of what such orders should be, there are three points of special interest—

Firstly, the whole strategic plan was based on placing a mass of Cavalry across the enemy's lines of communications and, as is shown by the C.-in-C.'s decision at the conference, all other considerations were subordinated to the achievement of this main objective.

Secondly, the advantage gained by cutting these communications so far back. The line Afule–Beisan lay 40 to 45 miles behind the enemy's front line, so that his infantry, pressed back in front and threatened on the flank, had at least two twenty-mile marches to make before they

came in contact with our Cavalry. Our presence on that line came as a complete surprise to them, and so great was the moral effect on men, who after three or four days' continuous fighting and marching thought they were at last about to reach safety, that they surrendered after slight resistance.

Thirdly, the stress laid on the avoidance of side issues and the utilising of every available man for the main task.

12. The story of what happened is well known. Thanks to the depth given to the Infantry attack and the concentration of Artillery fire the enemy's line was pierced to a depth of 3 miles within two hours of the opening of fire by the first gun; the 21st Corps wheeled to its right and began its advance towards the foothills and the Cavalry passed through the gap.

Within 36 hours they were on the line Afule–Beisan, having overrun all the reserves that the Turks tried to hurry to the scene of action. One Brigade reached Nazareth, 50 miles, in 28 hours and the 4th Cavalry Division, Beisan, 80 miles, in 36 hours. Within four days the whole of the Turkish Seventh and Eighth Armies had been destroyed and Haifa and Acre had been occupied. Within ten days Damascus had been captured and the Turkish Fourth Army, which had been East of the Jordan, together with the garrison of Amman, had ceased to exist. Within 36 days our Cavalry had occupied Aleppo (300 miles as the crow flies from the point of departure) and were across the Bagdad Railway, the only decent line of communication between the Turks in Mesopotamia and Constantinople.

Out of an estimated total of 105,000 Turkish troops South of Damascus 80,000 passed through our cages, and, although it is impossible to estimate their loss in killed, the number must have been very great, for, in addition to those who lost their lives in the initial attack, a large number were killed by our cavalry, aeroplanes and machine guns during the pursuit, and our Arab allies found in the destruction of stragglers and fugitives a task very much to their taste.

Practically the whole of the enemy's transport and artillery (360 guns), with some 800 machine guns, fell into our hands.

It was, perhaps, the most complete victory which ever fell to the lot of a British Commander.

13. I will now show a few photographs of the country over which the pursuit took place:—

Afule, occupied by the Fourth and Fifth Cavalry Divisions on the morning of the 20th.

Nazareth, where the 13th Cavalry Brigade arrived also on the morning of the 20th, finally occupied on the 21st.

Shemak, at the south end of the Sea of Galilee, taken by the 3rd A.L.H. Brigade on the 25th after a stiff fight.

The bridge of Benat Yakub over the Jordan north of the Sea of Galilee, where the Australian Division met with severe opposition and

which they turned by swimming their horses across two miles south and near Lake Hule.

The road between the Jordan and Damascus.

View of the Anti Lebanons taken from Damascus.

The defile of Barada through the Anti Lebanons on the road from Damascus to Beyrut, where the 3rd A.L.H. Brigade cut off the remnants of the Turks fleeing from Damascus and destroyed them by machine gun fire.

A typical bit of country near Aleppo.

14. In visualising a pursuit "conducted at the highest pressure until the enemy is completely destroyed" ("Cavalry Training," sec. 7) or "continued by day and night without regard to the exhaustion of man and horses so long as the enemy's troops remain in the field" (F.S.R., 128) one is, perhaps, apt to imagine a mass of horsemen riding relentlessly after a disorganised rabble with no other objective than their immediate destruction. Any such conception would be completely at variance with the facts, if we judge by what took place in Palestine. This pursuit was rather of the nature of a combined operation, in which the Royal Navy, the Royal Air Force and an Infantry Division took part.

15. On the same day (23rd September) as the 15th Cavalry Brigade took Haifa the 7th Indian Division started on its march from about Tul Keram to Haifa along the coast road. Their advance Battalion in lorries arrived on the 24th and relieved the Cavalry, at the same time the Royal Navy cleared the harbour of mines and within 24 hours of the arrival of the first troops on land had landed stores and opened up a new base, thereby shortening the Cavalry line of communication with Damascus by about 100 miles. Not only so, but the Navy assisted the march of the Seventh Division by landing supplies from lighters on the coast during this march and their subsequent movement on Beyrut and Tripoli.

On 8th October the advanced troops of the Seventh Division reach Beyrut. The Navy opened up a new base and the 5th Cavalry Division, which had reached Rayak, half way between Damascus and Beyrut, was able to continue its advance to Homs.

On the 18th the advanced troops of the 7th Indian Division reach Tripoli, and again the Royal Navy cleared up mines, opened a base and landed stores, thus enabling the 5th Cavalry Division, which had reached Homs on the 16th, to continue its march to Aleppo.

16. I believe that the Naval Squadron which co-operated took considerable risks in rushing supplies into these places along the coast, which had been carefully mined; but there is no doubt that it was due to the rapidity with which they carried out these duties and to the fine marching of the Seventh Division, that the Cavalry were able to reach Aleppo before it was fully reinforced.

I do not know of another instance in history in which the operations of a force of Cavalry were dependent on co-operation with the Navy.

Whilst on the subject there is one point on which I should like to hear the opinion of Naval Officers, and that is the conditions under which naval guns can best support an attack on land, and what improvements, if any, can be made in means of communication between the ships and the attacking troops.

Two destroyers, the "Druid" and the "Forester," took part in the bombardment on the opening day, 19th September, and I hope I shall be forgiven when I tell you that the Cavalry accuse them of adding to the excitement of the advance.

I have heard it suggested that naval guns might have assisted in the taking of Haifa, but I cannot help feeling that the difficulties which were made apparent in the former case would have proved almost insurmountable in the latter.

17. From what I have said you will realise that the pursuit was no haphazard operation, but that the Cavalry were always set a difficult and limited task, and as soon as this was completed a halt was called by the high Command until the rearward services were organised for the next bound forward.

18. There is one outstanding tactical lesson brought out by this campaign and that is that, where no physical obstacle exists (such as barbed wire), Cavalry can charge riflemen and machine guns in positions with every prospect of success.

On no less than 12 occasions during these operations did Cavalry charge infantry and machine guns in position and in ten of these actions were entirely successful. Of the two which can be classed as unsuccessful, one was the mounted attack attempted at Irbid, in which a Squadron of the 2nd Lancers of the 10th Cavalry Brigade failed to reach the Turks, who were esconced behind the walls of the village, and, after suffering casualties, were compelled to hold what ground they had gained until morning. The Turks retreated during the night.

The other partial failure, the last action in the campaign at Haritan, north of Aleppo, in which six squadrons of the 15th Cavalry Brigade attacked some two thousand Turks with many machine guns and two or three batteries of artillery in position. Though it was in itself a failure and the squadrons were compelled to rally to the rear, it had such a moral effect on the Turks that they withdrew 18 miles during the following night and took up a new position, in which they remained until the armistice was declared.

I wish I had time to describe to you even a few of the ten completely successful charges against machine guns, but each would almost require a whole lecture to itself if the details which are so instructive are to be brought out. Some are described in Colonel Preston's book and others in more detail in various articles which have appeared from time to time in the *Cavalry Journal*.

All Cavalry Officers should make a careful study of them, as they prove once again the old lesson that a desire to close rapidly with the enemy is the chief essential to a Cavalry success.

Perhaps the most interesting were: Haifa, where an almost impregnable position was taken, together with three batteries of artillery, some 1,300 prisoners and 12 machine guns; Remte, where the Yeomanry, after failing in a dismounted attack, mounted, and in the charge took 100 prisoners and three machine guns; Abu Naj, where the 29th Lancers charged 30 machine guns in action and took the lot, with few casualties; and so on through the whole ten. You must read the details for yourselves.

19. There is one point of special interest and that is that in no single action did more than a brigade take part, and the greater number were fought by regiments and squadrons.

The use of a mass of Cavalry does not imply the old conception of a Cavalry mass concentrated in close formation, manœuvred as a single unit and capable of breaking down opposition by its own momentum; but rather a series of small mutually interdependent actions, calling for great initiative and resource on the part of subordinate Commanders and co-ordinated by the higher Command with a view to the attainment of a common objective.

Between 20th and 22nd September the three Divisions held a front of 25 miles from Jenin to Beisan and it was during this period that the greatest number of prisoners were taken. It might almost be said that the Napoleonic principle was inverted in this case: the Cavalry were concentrated for the march and dispersed in action.

20. I believe that there are a certain number of people, some of whom I hope are present, who would like to see the Sword and Lance allotted a permanent place in the Museum of this Institution, among the flint instruments and cross-bows. Such doubters will not challenge the facts that I have put forward, but will insist that the Turks were a disorganised rabble, and that the normal effect of any horsemen, even though armed with tooth-picks, would have been sufficient to throw them into confusion.

It is true that the *morale* of the Turks was not so high as it had been, the rapidity with which the initial infantry attack was carried through proves that, but some very stiff rearguard actions were put up by the Eighth Army on 20th September against our Infantry, and I believe that their casualties on the second day's fighting were as heavy as on the first.

Of the Cavalry actions to which I have referred, those at Haifa and Haritan were fought against troops that had not been previously in action, whilst the majority of the others took place either during the advance to the line Afule–Beisan, against the enemy's reserves, or during the pursuit of the Fourth Army, which was not seriously attacked and was retiring according to plan. It is hardly fair, therefore, to write down

the success of these Cavalry charges to the demoralisation of the enemy; in any case no one can argue that the charges at Huj and El Mughar earlier in the campaign, which were made when the infantry attack had been brought to a standstill by hostile fire, were made against disorganised troops.

21. I am absolutely convinced that, tactically, success was entirely due to a bold use of the *arme blanche*, combined where possible with covering fire of artillery and machine guns. The great increase of fire power in a Cavalry unit, due to the introduction of Hotchkiss guns and the increase in the number of machine guns, set free a larger number of men for the mounted attack, and in the majority of cases covering fire from dismounted riflemen was unnecessary.

I think that the secret of the success of these mounted attacks against infantry and machine guns in the open lies in the fact that they were nearly always made in considerable depth and always at wide intervals. Such a formation forms a difficult target and the enemy's first feeling of surprise that his fire inflicts comparatively few casualties, rapidly turns to panic as he sees line after line of Lancers galloping down on him; he feels: "I may hit some of the first or second line, but shall I ever be able to stop those in rear before they are on top of me?"

These are, however, the views of a Cavalry Officer, so for the benefit of those who hold that the retention of the white weapon is due to the innate conservatism of the British Cavalry; and that equal or greater success would attend mounted riflemen or machine gunners, I will read you an extract from Brigadier-General Wilson's 3rd A.L.H. Brigade:—

> "The Cavalry sword was issued to all ranks of the Australian Mounted Division prior to the final general offensive. The Division had received a fair amount of training in the use of the bayonet as a sword for shock action. The bayonet was not, however, satisfactory. The issue of the sword was, I consider, more than justified. I consider that the sword has a great moral effect both on the man carrying it and on the enemy. One of the chief values of the sword is the spirit of progress it inspires in the carrier. He does not allow himself to be bluffed by slight opposition. He rides on feeling that he has a weapon in his hand and 19 times out of 20 finds the opposition only a bluff. With the mounted riflemen, on the other hand, his only course is to make a wide flanking movement to induce the opposition to retire, or to dismount and try to shift it with fire action. This all means time, or uncertainty, which is exactly what the enemy wants. Take the operations at Huj in 1917. With my late experience I can see what we could have done with the sword there. We were engaged with large bodies of the enemy somewhat disorganised. We had no swords and could only deal with them by fire action. The regiments engaged them at a distance. They took prisoners and inflicted casualties but did nothing really big. If they had had swords,

I am now confident that they would have made wholesale captures. It is not reasonable to expect mounted riflemen to charge positions mounted."

22. There is a tendency even among Cavalry Officers to underestimate the difficulties in the way of country which can be overcome. I have just come from Ireland, and when I first went there I found that many of the Cavalry Officers thought that they could not move across a closely enclosed country such as Kildare. On being encouraged to try they found that the only sort of country in Ireland over which they could not move at a certain pace, was bog. With a pair of wire-cutters it is possible to get about almost anywhere, though it is not by any means possible always to go the shortest way. A squadron moving across country to turn a position may take nearly as long as Infantry would to reach their objective, but they arrive at the end of the journey fresh and ready to fight, mounted or dismounted. I expect that most Infantry Officers in open warfare have had the experience of arriving in front of an enemy's position which they would be only too glad to turn, but have found their men too exhausted to make a long turning movement.

The country over which the operations in Palestine were carried out was, as I have shown you, anything but an ideal Cavalry country.

It is the boast of the Mountain Artillery that they can move over any country which men can cross without using their hands, and I hold that this campaign has shown that Cavalry can do the same.

23. Attention has sometimes been drawn to the difficulties of moving large bodies of Cavalry at night and to their alleged inability to attack under the cover of darkness.

This campaign has proved that the first of these difficulties can be overcome by good staff work. The whole of the three Divisions were moved up to their concentration point by night. The Fourth Division from the Jordan Valley covered the distance of 65 miles in three night marches (11/12–13/14) and made use of the same road as one Infantry Division and a large quantity of heavy artillery.

The whole Corps marched throughout the night of the 19/20th in order to reach its positions as early as possible, and this over an unknown and badly-mapped road. Some units certainly did miss their way during this march, but they were at once put right again; and of the whole Corps, I know of only one squadron which was not in its allotted position by daylight. The distance covered was about 50 miles, and the roads, where they existed at all, were mere tracks.

As regards actual fighting at night, I can quote you three occasions in which Cavalry took the offensive during the hours of darkness.

At Nazareth, at the night 22nd, the outposts reported a strong body of Turks approaching from the direction of Haifa, and a dismounted counter-attack was at once ordered and the 18th Lancers attacked with the bayonet and captured 300 prisoners.

Near Beisan on the night of the 21st a party of the C.I.H. made a mounted attack on the head of a Turkish column retreating from Nablus. The charge was made by moonlight and so great was its moral effect that the whole column halted for the remainder of the night. It was carefully picketted and in the morning of the 22nd surrendered practically without fighting.

An operation on a larger scale was the attack by the 3rd A.L.H. Brigade at Sassa during the advance on Damascus; here the Turks put up a stubborn resistance and, as the ground was considered too bad for a mounted attack to be made by night, troops were moved to a flank, dismounted and attacked the position on foot; the attack began about 10 p.m. and the position was taken at 2 a.m.

24. There were certain conditions which tended to facilitate the task of the Cavalry in this campaign, and I think it is worth while drawing attention to them, as illustrating a situation peculiarly favourable to Cavalry action on a large scale.

(*a*) We had practically complete mastery of the air.
(*b*) There was a marked absence of barbed wire behind the enemy's front line and no well-organised strong points or pill boxes.
(*c*) The enemy had no gas.
(*d*) We could move off the roads almost anywhere, if necessary. though the going was for the most part so bad that unless in action it paid to march on the roads rather than to move on a road front.
(*e*) The enemy were weak in cavalry and those that they had were of inferior quality, and adopted dismounted tactics, never attempting to meet our mounted men.
(*f*) Throughout practically the whole of the operations the Cavalry lived on the country, at least as far as necessities were concerned. Sheep and goats, barley and millet were the mainstay for man and horse.

Military stores and groceries were brought up by lorry as occasion offered from advanced bases.

This point is of interest because the casual observer passing through this country would, I think, have said that it would be impossible to support even one brigade on local resources.

25. On the other hand, there would be certain difficulties to overcome which would not occur in every theatre of war.

The greatest of these was the lack of water. With the exception of the big rivers, the Jordan, the Litani and the Orontes, there was practically no "living water," to use the words of the Psalmist, in the whole area traversed. We had to depend on water holes and wells in the villages, and it was often necessary to regulate the length of marches according to the water supply. Maps were provided before the beginning of operations purporting to show points where water could be obtained, but as these were necessarily founded to a great extent on information

from prisoners and the like, they sometimes provided disappointment. East of the Jordan and north of Damascus water was for the most part obtained from cisterns, cut out by the natives, in which the winter rains were stored, and the watering of a brigade from these was a lengthy and difficult business. The supply was very limited, and in many places, had a situation arisen which necessitated a halt of more than a day's duration, the supply would have been exhausted.

Communications were also, I think, more difficult than would be the case in many other countries. The telegraph along the railways was practically the only pre-existing line. Motor-cycles and motor-cars did extraordinarily good work, but we were to a great extent dependent on wireless and aeroplanes. As you have seen, the roads were bad, and after rain impassable for lorries, so that the supply of ammunition and groceries caused many anxious moments; the latter sometimes failed for days on end. The former arrived on at least one occasion by aeroplane.

26. I should now like to put before you a question for discussion. I think you will admit that, without Cavalry or some other highly mobile force capable of acting far from its base and living on the country, the campaign would have been indefinitely prolonged and probably indecisive. The Turks could have retired to the Saleh–Kakon–Nablus line, which could have been occupied by their reserves long before our infantry could have reached it, and later, if necessary, to the Haifa–Nazareth–Tiberius line, and thence fought a series of rearguard actions all the way to Damascus.

It is interesting to speculate whether any other mobile force could have taken the place of Cavalry in this campaign. I think that Mounted Infantry may be ruled out: they possess no advantages over Cavalry, and I have already quoted General Wilson, who took part in the campaign first as a mounted infantryman and then as a cavalryman, to show that in the opinion of one who was born and bred a mounted-rifleman, the sword and lance were necessary to overcome opposition with sufficient rapidity to secure the best results. I hope there is some one here who will put forward an opinion as to whether tanks alone or in co-operation with lorries could have achieved the same results as Cavalry.

27. I have shown you photographs of the country, and must leave it to others to decide whether or not the greater part of the area over which operations took place ought not to be marked " Blue " or unsuitable for tanks. It must be remembered that the Armoured Cars were successful in reaching Aleppo, but they were lucky inasmuch as they were safely across the plain of Esdraelon before a heavy thunderstorm took place on the 21st, which would, had it occurred 24 hours earlier, probably have robbed us of their co-operation during the later stages of the campaign.

I must admit that I find it difficult to envisage tanks possessed of the flexibility necessary to carry out such operations without the

assistance of Cavalry, and although they could undoubtedly have overcome the opposition met with, I think that their protection whilst passing through defiles and the rounding-up and handling of a large number of prisoners would have presented a very real difficulty. On the other hand, tanks acting in co-operation with Cavalry would have been of the greatest value, especially when attacking mud villages, which are common in this country, and they would have been almost essential had the enemy made use of barbed wire in their rearguard defences.

28. I believe that there is in existence a tank with a speed of 20 miles an hour and a radius of action of 1,000 miles, but F.S.R., 14·4 states that "the radius of action is governed by the amount of petrol that can be carried on the tank and the physical endurance of the crew," while Tank Training, 17·7, says that "Continuous movement in a closed tank imposes a severe physical and mental strain on the crew, and the employment of the same tank units in action on consecutive days invariably leads to disorganisation and loss of fighting power," so that when I read in F.S.R., 128·2, "tanks are not generally suited for co-operation with Cavalry in the pursuit," I am at a loss to decide whether it is because the tank cannot keep up with the Cavalry or the Cavalry with the tank. If the former is at present the difficulty, it will no doubt to a great extent be overcome by the advance of mechanical science, and if the latter, though the tank might be delayed and limited in its sphere of action by attachment to Cavalry, I cannot help thinking that the advantages to be gained in striking power and flexibility would more than outweigh the possible limitations.

29. I have already pointed out that one of the conditions peculiarly favourable to the use of a large mass of Cavalry in this campaign was their freedom from attack by hostile aircraft and as this is a condition which is unlikely to occur again in any but small wars, we must look for some means of protecting Cavalry against such attacks and, apart from a careful study of the tactics to be adopted to counteract this danger, I think that it is possible that a light cross-country tractor carrying an anti-aircraft gun may in the future form part of the artillery of every Cavalry brigade. If money is forthcoming to allow our mechanics and inventors to produce tanks capable of co-operating with Cavalry in the pursuit, I cannot help thinking that there is a great future before a combined force of tanks and Cavalry, not only in the pursuit, but in almost any stage of a campaign.

30. Before I sit down I should like very briefly to summarise the achievements of Cavalry in Palestine.

The greatest distance covered by any large body of Cavalry during the 36 days that the campaign lasted was 500 miles, the rough total of marches accomplished by the 5th Cavalry Division on reaching Aleppo. Two mountain ranges had been crossed and much barren and semi-desert country, where water was scarce. Some 48,000 prisoners had been taken and escorted back to the Infanty. During the whole

of this time the Cavalry practically lived on the country, and were generally 100 miles from the nearest base. The horse casualties in the 5th Cavalry Division amounted to 21 per cent., inclusive of all killed, wounded, missing and evacuated for other causes.

Although there was a great loss of men, due to malaria contracted during the months spent in the Jordan Valley, the battle casualties were exceedingly light and, as far as Damascus, only amounted to about 2 per cent.

The prisoners taken by the Cavalry alone during these operations amounted to nearly 50 per cent. of the whole ration strength of the Turkish armies in the field, and this at a cost of a total loss of personnel killed, wounded and missing of about 2 per cent. I think that you must admit that the Cavalry in this instance solved the main problem of battle as propounded by Colonel Fuller: "the giving of blows without receiving them."

31. Though I do not wish to suggest that the peculiar circumstances which made the use of a large mass of independent Cavalry the decisive feature of this campaign are likely to be exactly reproduced in the future, I cannot help feeling that the conditions under which any campaign is probable during the next decade will approximate much more closely to those in Palestine than to those in France, and until we can produce machines that can go wherever Cavalry can go, and that can achieve everything that Cavalry can achieve, we must depend on the man and the horse to obtain really decisive results.

DISCUSSION.

GENERAL LORD HORNE: I rise mainly because it is desirable that there should be some discussion to follow this lecture and I know it is difficult to have a discussion unless somebody takes the lead. First of all, I am sure I shall carry you with me when I congratulate Colonel Weir on his most excellent lecture, which was so well delivered and dealt so comprehensively with a subject which is at the back of a great many people's minds at the present time. Did time permit there are several points upon which comment might be made. I will, however, summarise what I have to say by remarking that Colonel Weir has given us details of an example of splendid conception, splendid staff work, splendid arrangements and splendid execution. This campaign in Palestine will, I am sure, go down to posterity as a masterly solution of a difficult problem. One more point. During the latter 2½ years of the war I remember well hearing it said on many occasions: "The day of cavalry is past; cavalry is doomed; cavalry fulfils no good purpose." I remember hearing the same remark a dozen or fifteen years ago when some people held that the infantry rapid fire had sounded the doom of cavalry. They were not right then; I do not think they are right now. I do not think you will find in that school many soldiers of experience, nor many who have borne the responsibility of high command in war. The man who would abolish the mounted branch has, in most cases, formed his opinion from the Great War, but he has forgotten or neglected to study the first few weeks of that war, and has probably a very superficial knowledge of the operations which led to the defeat of the Turk

and the conquest of Palestine. The tendency is to form our idea of war from the experiences of the long period of Trench Warfare in France and Belgium, a period of stalemate, a period of impotency, when each belligerent recognised his inability to enforce his will upon his opponent, a period when flanks rested upon impassable obstacles and manœuvre was impossible. The conditions of this period of Trench Warfare were unique; such a situation had never occurred before and is unlikely to occur again, certainly not until both armies have failed to obtain a decision by mobile operations. Is it sound to base our estimate of the value of different arms on experience gained under such abnormal conditions? Let us broaden our outlook. Let us look at what may be considered a more normal aspect of war and examine what the British Cavalry did in France and Belgium in August and September 1914, in Palestine in 1917–18, and again in France and Belgium in March, September, October and November 1918. We have got the conditions of Trench Warfare on the brain; we sadly want to clear our minds and do some hard thinking. Let us start by asking what the British Army exists for?—certainly not for such a war as we have just brought to a victorious conclusion. It exists for war of manœuvre, and for war of manœuvre we must have, as in days gone by, our horse, foot and artillery, with up-to-date armament and with every adjunct that science can evolve, such as aeroplanes, tanks, etc.—contrivances which tend to maintain mobile conditions. I am convinced that clear thinking will lead us to decide that the day is not yet when mechanical and other contrivances can take the place in war of either the man with the rifle, or the man on the horse.

LIEUT.-GENERAL SIR A. GODLEY: Mr. Chairman, as you force me to speak, there are, perhaps, just one or two things that I would like to say. First of all I should very much like to support what Lord Horne said about the admirable way in which Colonel Weir gave us his most interesting lecture. It was one of the best I have ever heard in this Institution. Probably some of you know that I am a very ardent mounted infantryman and always have been, so that you can hardly expect my friend, Colonel Angus McNeill and myself, to sit still while the lecturer says that he can rule out mounted infantry. I do not think he really means that. What he had in his mind—and I most cordially agree with him in regard to it—is that you do want, and I am perfectly certain always will want, the best form of mounted man you can get, on the best horse you can get, for wars, as Lord Horne has said, such as we shall always be engaged in. What the exact form of that mounted man is to be I will not discuss. There is only one thing I will say in connection with it, and that is that I think the best weapon that any mounted man can have is his horse. You may talk about your rifle, your bayonet, your sword, your lance or anything else, but really what you want is a good horse and a determined man on his back; and if you have got that combination I do not believe it makes such a very great amount of difference what he carries in his hand. If he sets out determined to get to any particular place he will get there. In the case that has been referred to to-day by Colonel Weir he did get there. I know a great many of those who took part in this great exploit of mounted troops. I know all the Australians; I know all the New Zealanders; I even know Colonel Wilson who produced the dictum which the lecturer has quoted: their training was a Mounted Infantry training. Far be it from me to say that Colonel Wilson is not qualified to produce such a dictum; anyhow the fact remains that these gallant mounted troops, among whom it just happens that there, unfortunately, were not, I believe, any British regular cavalry, achieved this brilliant victory. One only wishes that the British regular cavalry had been there to take part in this magnificent exploit. One other point occurs to me, and that is that from my experience

of mounted troops and mounted work, I agree with what the lecturer said about the probability that their greatest use, when it comes to the actual fight and the actual charge, will be in comparatively small packets, such as a brigade and a regiment. I doubt if such large bodies as corps and divisions of mounted troops can, under modern conditions, be used as they have been in previous campaigns. But whatever modern inventions and mechanical applicanes there may be, you may always, in the end, have to fall back on the combination of the man and the horse.

THE CHAIRMAN (LIEUT.-GENERAL SIR PHILIP CHETWODE): Before I make any comments on the lecture or what has followed, I would like to make a few general remarks. I am intensely interested in the subject and very anxious that all soldiers should look at it from the broad general point of view of beating the next enemy we are up against, and not from the narrow point of view of one arm alone. There has been a good deal of somewhat acidulated discussion since the war on the question of the utility of mounted troops. This is quite natural. The vast majority of the officers of our Army now remaining served on the French and Belgian fronts. Very few are left who took part in the retreat, or the advance to the Aisne, and there are not a great number who served in Mesopotamia or in Allenby's final victory in Palestine. We may, therefore, divide our officers, roughly, into two classes—those who have seen cavalry work and know what they can do and did do, and those who have, to all intents and purposes, unless they are older men and took part in the South African war, never seen cavalry work in war and have no idea how very uncomfortable and, indeed, impossible it is, as things are at present, for infantry and the other arms to conduct a war of movement without them. They do not grasp how difficult it is for the other arms, even with the assistance of aircraft, and the tank in its present state of development, to conduct an approach march without them, to conduct a reconnaissance of the enemy from which they can plan their own subsequent action in the battle, to carry out the actual battle if their flanks are a source of anxiety to them, or how bitterly disappointing it is to them, having defeated their enemy, to find that they are "all out" after their prodigious exertions and are unable to complete and exploit their victory, unless they have mounted troops to co-operate with them in all these ordinary and recurring phases of a war of movement. It is very natural that men, especially young men, should be deeply impressed with what they have seen and experienced themselves in war and imagine that these experiences are the last word. We older ones must use all our endeavour to prevent the Army of to-day and the future from thinking that the lessons learnt in the trenches are the only lessons of the war and allowing this experience to be the sole foundation of our future ideas in our training. All war tends to alter and modify tactics, sometimes owing to the genius of a Commander, sometimes owing to new weapons and discoveries or improvements in older ones. But let us be careful to review the lessons of the late war as a whole and not from the point of view only of the men in the trenches. Do not let us say there is no other form of war possible. If we do we shall make the mistake of our lives. We know for one thing that, in the many small wars our Empire is so often engaged in, a static war is almost impossible, and I would like to suggest to you that it is very improbable that it will occur again in anything like the form it did, even in Europe. Has it not struck you that no nation and no General Staff will voluntarily submit again to a war of attrition behind barred wire, with all its attendant evils of inordinate length, immense casualties, great cost and probably indecisive results, if they can prevent it? All the best brains in the world, scientific, mechanical and

military, are engaged in the task, some directly and some indirectly, of evolving, slowly perhaps but surely, a modern division and a modern army so much more swift-moving and hard-hitting than the division of 1918 that a war of position will be difficult, if not impossible. I do not say, of course, that a war of trenches in some form will not take place during certain phases of a campaign or in certain portions of a large battlefield, but I would like to quote to you what Marshal Foch said to Sir Henry Wilson :—" The nation that goes to war again and thinks that it will be able to shelter behind a line of trenches while it creates a new army will meet with disaster." Marshal Foch also said to Sir Henry Wilson :—" No man living knows what the division of ten years hence will be like." Now, if you agree with me that it is certain that the army of the future must be quicker-moving and harder-hitting for its size than it has been heretofore; you will also agree with me that mounted troops are an essential portion of a swift-moving army, and that up to the present nothing has definitely displaced them in war, though certain things have modified their use, and for the present and, I think, for some time yet, modern inventions will not displace mounted troops, but that with the aid of mechanical cross-country artillery and transport, tanks and aeroplanes, the mounted arm will be in the next war many times more powerful than it is now. That is the faith that is in me, but in these days of rapid scientific and mechanical invention a man would be a fool to venture on more than that. We have formidable rivals beginning to appear and formidable menaces to our existence in the battlefield. Some we can make use of to our own advantage, and some, so far, we can only adopt defensive means against. We can use smoke, wireless, aeroplanes, tanks, improvements in weapons, and cross-country transport and artillery to our own advantage to make us far-seeing, quicker-moving and harder-hitting and with a larger radius of action. So far we can only defend ourselves against the air and must flee before gas. So I say to you that the mounted arm is still essential in the battlefield, with the very definite proviso that if we stand still and think that the training and tactics of 1914 will suffice for ten years hence we shall disappear from the field and we shall deserve to. Our whole efforts and energy, and that of all other arms too, must be devoted to studying, to sifting, to discussing, to experimenting and finally evolving, of necessity slowly, a fighting machine the whole soul of which is the determination to engage in an offensive war of manœuvre. Do not let us think that the performance of the cavalry in Palestine represents the last word in the use of cavalry, or that the methods they employed are patterns for the future. They are most decidedly not. They put up a splendid show, and a show which, as things were and are still, no other arm could have brought off. Neither tanks nor aircraft nor any other invention in their present state of development could have done what they did. Allenby knew what he was up against and used his cavalry in the method he knew would succeed against what they had to meet. But Colonel Weir has already told you that the enemy had no cavalry, no gas, no tanks and above all no aircraft, and he would be, I am sure, the first to say that if the enemy had had these modern aids to war and knew how to use them, even if we had been equally well provided, their task would have been very different and their progress would have been vastly slower, their tactics different, and the results proportionately less. To give you only one example. We can never hope to obtain mastery in the air in the sense that we can obtain it on the sea, and I give it you as my considered opinion that in a future war when both sides have many hundreds of aircraft—unless we meanwhile invent or discover some absolutely efficient anti-aircraft weapon—no body of cavalry even as large as a regiment will ever again be able to move or halt by day during a battle in mass formation or anything approaching it, still less a brigade or division.

Many officers here who know what bombing became in the last stages of the war will agree with me. That is a certainty, and think what that means. Up to the present we have always considered it necessary to mass for manœuvre and even for movement from one place to another in order to ensure command and co-ordination of effort. We shall in future have to co-ordinate our efforts from such dispersed formations and from such distances—one body from another—that were never even dreamt of before the War. Wireless will help us no doubt, but it is obvious that we have, in that respect alone, to alter the whole of our methods.

COLONEL GREEN: Ladies and Gentlemen, I am sure you would not like to leave the theatre this afternoon without according a very hearty vote of thanks to Sir Philip Chetwode for occupying the Chair. We have enjoyed very much indeed all the lecturer has said about the cavalry operations in Palestine, and I am sure we have enjoyed fully as much, if not more, the concluding remarks of the Chairman. They are remarks which we must take to heart and think out very fully in the future. As Sir Philip Chetwode said, we have in the future to cancel trench warfare from our minds altogether, but I am perfectly certain that there will have to be co-operation between every branch of the Service—between the cavalry and the infantry, the tanks and fast-moving mechanically driven transport. I will not say anything more, beyond asking you to accord a very hearty vote of thanks to Sir Philip Chetwode for presiding over the meeting this afternoon.

The resolution of thanks was carried by acclamation, and the meeting terminated.

THE CROSSING OF THE CANAL DU NORD BY THE FIRST ARMY, 27th SEPTEMBER, 1918.

By MAJOR-GENERAL W. H. ANDERSON, C.B., Commandant Staff College (late Major-General, General Staff, First Army).

On Wednesday, 25th January, 1922, at 3 p.m.

GENERAL LORD HORNE, G.C.B., K.C.M.G., R.A. (A.D.C. to H.M. The King), in the Chair.

THE CHAIRMAN: Major-General Anderson, Commandant of the Staff College and for more than two years Major-General on the General Staff of the First Army, will describe to us to-day a battle with the details of which he is intimately acquainted and of which I think it may be claimed the features are of peculiar interest. I appeal to the officers present to add to the general value of the lecture by discussing such points as may arise. I will now ask General Anderson to commence his lecture.

LECTURE.*

THE operations of the First Army in the battle which I propose to discuss are of tactical interest, in view of the successful forcing of the Canal du Nord in the face of an enemy in position.

The co-operation of artillery, engineers, machine guns, infantry, tanks, aeroplanes, smoke and gas, make it a typical example of a modern battle at the end of 1918.

2. GENERAL SITUATION.

I will first briefly recall to you the general situation of the five British armies in France during the last 100 days in 1918, flanked on the right by General Debeney's First French Army, and on the left by the French and Belgians under the King of the Belgians.

Line of 1st May—Line of 8th August, morning.

By the Battle of Amiens (8th August) the Fourth Army disengaged that town, until then within range of the German guns, and freed the Paris–Amiens railway.

* NOTE. This lecture was illustrated by large maps and lantern slides.

Then the Third Army attacked on the Ancre on 21st August, gained the line of the 26th August, morning.

Action of the First Army.

Then the First Army attacked on 26th August east of Arras, the Canadian Corps south of the Scarpe River, supported by the VIIIth Corps north of the river. That gives us the line for 2nd September, morning.

On 2nd September the Quéant–Drocourt line was broken and the enemy was forced back on to the outer defences of the Hindenburg line.

After the capture of the Quéant–Drocourt line, the Canadian, and part of the XIIth Corps, south of the Scarpe, advanced close up to the line of the Canal du Nord, and we get to the line of the 27th September—the morning of the battle I am going to deal with.

3. Situation of First Army Front—September.

During September communications were improved, dumps formed, and all necessary preparations carried out for an early resumption of operations, including reconnaissance for crossing over the Canal du Nord and the Sensée.

Position of First Army: South of Scarpe—North of Scarpe.

On the 7th September the Army Commander received the orders of the Commander-in-Chief to take such action on the army front north of the Scarpe as would lead the enemy to anticipate attack on a large scale on this front, and to draw off reserves from the main scene of operations.

Orders were accordingly issued to the troops north of the Scarpe to prepare for attack on a large scale. Tanks and infantry were trained in co-operation in localities where they could be observed by hostile planes, additional balloons were put up, reconnaissance of the whole front between the Scarpe and the La Bassée Canal was carried out by officers of the Cavalry Corps and Tank Corps, artillery registration was carried out by single guns and sections in advanced positions, wire cutting and patrolling were carried out systematically, forward dumps were formed and additional casualty clearing stations erected, everything being done to give the Germans the impression impending attack.

Our own troops soon suspected that the attack was only camouflage, and the operations were therefore "postponed;" but Corps Commanders were instructed to carry out minor operations on their fronts, and do everything to keep up the deception.

The enemy showed his nervousness by raids and patrolling and by constant concentration of gas on our forming-up places; he reinforced

the front north of the Scarpe by three divisions, neglecting the danger of attack south of the river, and allowed himself to be in great part surprised by the attack on the Canal du Nord when it came on the 27th September.

Preparations for this attack were pushed forward, and definite orders for the operation were issued to corps by the First Army on 18th September.

G.H.Q. Orders.

On the 22nd September orders were issued by G.H.Q. for—

(*a*) *The First Army* to attack on Z day; to capture the heights of Bourlon Wood and secure its left flank on the Sensée River, and operate so as to protect the left of the Third Army.

(*b*) *The Third Army* to attack on Z day in co-operation with the First Army, and operate so as to be in a position to co-operate closely with the Fourth Army on Z + 2 day.

* * * * *

(*c*) *The Fourth Army*, protected on its right flank by the First French Army, to deliver the main attack against the Hindenburg Line on Z + 2 day.

* * * * *

Preliminary Moves and Dispositions.

On the 25th September Z day was fixed for the 27th.

During the 25th and 26th the Canadian Corps (which included the 11th Division) concentrated south of the Arras–Cambrai Road; the 2nd Canadian Division, which till then had been holding the corps front, was relieved by the leading brigades of the 4th Canadian Division, 1st Canadian Division, and 11th Division, and went into corps reserve. 24 tanks (7th Battalion) moved up to their assembly positions west of the Canal. The 56th Division relieved the Canadian Corps north of the Arras–Cambrai road.

We then had in the line nine divisions (4th Canadian, 1st Canadian, 11th, 56th, 4th, 51st, 8th, 20th, 24th). In support, 3rd Canadian Division. In reserve, four divisions (2nd Canadian, 49th, 66th, 47th) and 1st Cavalry Brigade. Total, 14 divisions.

Dispositions of the Enemy.

The enemy's dispositions opposite First Army were as follows :—

In the line—

(*a*) Between Inchy and the Sensée Canal—three divisions.

(*b*) North of Sensée Canal—10 divisions.

In reserve—

(*a*) Immediately behind front of attack—two divisions.
(*b*) South of or astride the Sensée Canal—three divisions.
(*c*) Near Douai—at least three divisions.

Of the 21 German divisions facing the First Army therefore 13 were immediately disposed to meet attack north of the Sensée Canal, and only eight (three in the line and five in reserve) were immediately available opposite the real front of attack.

4. Consideration of the Operation to be carried out.

The object of the First Army, as laid down by G.H.Q., was to capture the Bourlon Wood heights, and then to secure its left flank on the Sensée River, and operate so as to protect the left of the Third Army. That meant crossing the Canal du Nord.

But the Canal du Nord was not a completed waterway—the war had interrupted the work in progress in 1914. It averaged about 100 ft. in width, with banks varying up to 15 ft. in height, and heavily wired. Between Lock 3 and Palleul it had an average depth of 8 ft. of water, with breaks of shallow mud and water. And the Agache, a sluggish, marshy stream, lined with willows, runs parallel to the canal, and some 300–500 yds. east of it, forming, with the marshy ground on each side, an additional obstacle to passage, with cover for machine guns.

Between Lock 3 and Mœuvres it was dry, except for occasional shallow pools, and a crossing could be effected by infantry without bridging. Some 200 yds. of the feasible crossing front at Mœuvres were handed over to the Third Army on our right shortly before the day of attack, so as to enable their left to attack behind (north of) the wire of the Hindenburg support line.

On this narrow front the approaches on both sides of the canal were dry and firm, and on the west side they had the further advantage that they were fairly well concealed by remains of houses, enclosures and hedges, so that it was possible to assemble troops close up to the canal.

North of Sains-les-Marquion the ground on each side of the canal is marshy and presented great difficulties for bridging or for approaches for wheeled traffic.

North of the Arras–Cambrai road, the ground on the western bank is bare and open to view from the eastern bank as far west as the Dury ridge, some 3 miles in rear.

All these facts led to the selection of the Mœuvres–Lock 3 front, some 2,700 yds., or about 1½ miles, for the actual attack on the canal.

Active patrolling and ostentatious wire-cutting had been carried out on the front astride the Arras–Cambrai road, and between the road and Palleul, so as to lead the enemy to expect attack on that front.

In this we were helped by the enemy's firm belief in the fondness of the British Army for frontal attacks on impassable obstacles.

The fact had to be faced that opposite Inchy the ground rises on the east of the canal for a distance of some 2,000 yds. by a gentle open slope to Quarry Wood and the Marquion defence line. Behind this a slight depression leads to Bourlon village, and then again rises to the high ground crowned by Bourlon Wood.

The attack in its first stages therefore would be exposed to direct and close fire from the Marquion defences, and under observation from the high ground at Bourlon Wood. But at the same time its progress could be observed from the high ground behind Inchy, definite objectives, such as the Marquion line, could be fixed as stages, and support by artillery was facilitated, and the ground was suitable for tanks. But perhaps the chief advantage was that the time to launch the reserves necessary to carry out the fanning-out movement on the far side of the canal could be gauged by Commanders by direct observation of the progress of the fight.

This fan out must obviously be very considerable: the first phase of the day's operations, the capture of the line from Fontaine-Notre Dame to the railway crossing over the canal extended the front to 9,000 yds. (5 miles), exploitation of success would still further extend the frontage, and the actual line eventually held on the evening of attack was 15,000 yds. long (9 miles)—no easy operation in the face of a determined enemy.

Plan of Attack.

The Canadian Corps were to attack with the 4th Canadian Division on right and 1st Canadian Division on left, and force the canal line between the northern end of Mœuvres and Lock 3.

4th Canadian Division to take Bourlon village and wood, and the line from Fontaine-Notre Dame (excl.) to Copse 500 yds. south of the Arras–Cambrai road.

1st Canadian Division to take Sains-les-Marquion and extend the line of the 4th Canadian Division on the north as far as Sauchicourt Farm.

The 3rd Canadian Division and 11th Division were to follow behind the 4th and 1st Canadian Divisions, and the four divisions were to reorganise on the captured line, so as to exploit success on a four-division front, in order from the right—3rd Canadian, 4th Canadian, 1st Canadian, 11th Division. In this order they would advance to capture the Marcoing line and Raillencourt, Haynecourt, Epinoy and Oisy-le-Verger.

The XXIInd Corps were to assist the operations of the Canadian Corps—

(1) by engaging hostile artillery north of the line Sauch–Lestrée–Epinoy;

(2) by bombardment with gas and smoke of Oisy-le-Verger, Palleul and crossings over the Sensée Canal between Palleul and Aubencheul-au-Bac;

(3) by engaging the enemy holding the Canal du Nord between Sauchy Lestrée and Palleul so as to deceive him as to the initial front of attack;

(4) by pushing the 169th Brigade, 56th Division (a weak brigade of not more than 1,600 men) across the canal, north of the Arras–Cambrai road, as soon as the withdrawal of the enemy in front of the 1st Canadian Division enabled them to throw bridges. This brigade was to turn northward and move in line with the attack of the 11th Division, clearing up the low-lying marshy fields between the canal and the Marquion line.

The VIIIth and XXIInd Corps to carry out such minor operations on the day of attack north of the Scarpe as could be completed with the troops then in line, without entailing relief.

Artillery Support.

The strength of the artillery supporting the attack was as follows :—

	Ordnance.	XXIInd Corps.	Canadian Corps.	Total.
R.A.	18-pr.	282	396	678
	4·5-in. How.	94	132	226
	60-pr.	30	60	90
	6-in. How.	80	142	222
	8-in. How.	30	18	48
	9·2-in. How.	16	34	50
	6-in. Gun.	4	16	20
	9·2-in. Gun.	3	1	4
	12-in. Gun.	1		1
	14-in. Gun.	1		1
	12-in. How.	2	4	6
	15-in. How.		1	1
				1,347 pieces.

The actual distribution of the fire of these guns is best shown by the barrage maps.

Superimposed on the first portion of the artillery barrage on the Canadian Corps front was the machine gun barrage.

In order to protect the left flank of the attack during its crossing over the canal and its subsequent extension to the north, two separate field artillery barrages were to be put down by the XXIInd Corps on the enemy's organisations east of the canal between Sauchy Lestrée and Oisy-le-Verger.

Barrage I. (four Brigades R.F.A.), starting at zero, dwelt for ten minutes on the west bank of the canal, and then crept forward at 100 yds. in two minutes until it passed over the rear defences of the Marquion line, and then rolled backwards and forwards over these defences at 100 yds. in four minutes until finally creeping back to its starting point by Z + 510 (8½ hours).

Barrage II. (three Brigades R.F.A.) was to come down at zero on the back of the Marquion line (farthest east of the former). It was to dwell ten minutes on this line, and then roll backwards and forwards at 100 yds. in four minutes over a further depth of 1,500–2,000 yds. till Z + 510 (8½ hours).

This barrage included Oisy-le-Verger and the bare slopes behind the crest of the ridge across which any German reinforcements must advance to reach the Marquion line.

Both these barrages fired one round smoke in 12 to add to the uncertainty of the enemy regarding the situation farther south.

The heavy artillery was to bombard various strong points on the Marquion line within the zone swept by the field artillery barrages, and to neutralise hostile batteries firing on the area of attack.

The crossings over the Sensée between Aubencheul and Palleul were kept under fire by two batteries (one 6-in. and one 60-pr.) to prevent the enemy crossing the river, and Palleul and Bois de Quesnoy were shelled with gas.

R.A.F.

The 1st Brigade R.A.F. were to bomb crossings over the Sensée between Palleul and Wasnes, and the roads behind the Marquion line, and also railway stations at Douai, Liebercourt, Dechy, and Cambrai.

5. Narrative of Attack.

The attack of the 27th September began with a minor operation carried out at midnight by the 8th and 20th Divisions (VIIIth Corps) near Arleux (in front of the Vimy Ridge), with a view to diverting attention from the point of the real attack, and to delay the movement of reserves. This was completely successful—Arleux was taken, and the enemy's front system for some 2,000 yds. north of the village to a depth of some 500 yds. Shortly after dawn a Chinese attack was made by the 51st and 8th Divisions on the Scarpe–Oppy front with a view to simulating an extension of the Arleux attack. A creeping barrage was put down and dummies were raised on the parapets in the early morning light.

The main attack opened at 5.20 a.m. with an intense bombardment of all natures, not only on the canal front, but along the Sensée and north of the Scarpe as far as Oppy and against the Lens defences. Intermittent bombardments and barrages were put down at various points along the army front during the day to increase the doubt as to the real front of attack.

1st Phase—1st Objective.

As soon as the bombardment commenced the 1st and 4th Canadian Divisions, who had formed up some 400–600 yds. from the west bank of the canal, rushed the canal on the Mœuvres–Lock 3 front, carrying with them the enemy posts west of the canal, and under cover of the barrage quickly carried the trenches and rifle pits lying some 200–500 yds. beyond it.

At zero + 33 ft. (5.53) the box barrage on the left flank began to move northwards and the 1st Canadian Division turned and forced its way into Sain-les-Marquion.

So far the enemy had been overwhelmed by the suddenness and impetuosity of the attack, but further advance up the bare slopes leading to the Marquion line met with stubborn resistance from rifle and machine gun fire. The advance of the 4th Canadian Division was checked by the enemy holding the fortified quarries of the Quarry Wood. But tanks had followed hard on the heels of the infantry, crossing the obstacle of the canal bed with little difficulty, and with their aid the Germans in the quarries and the wood were surrounded and captured, and by 7.30 (Z + 140) the Marquion line up to Keith Wood (Red objective) was in our hands.

The hostile artillery had been weak. At first it had been concentrated on our battery areas, but had soon shifted on to the line of the Canal du Nord. Their fire was mainly directed, however, on to the crossings at Marquion on the main Arras–Cambrai road, and north of that village, and consequently clear as yet of any attempted passage by our troops. About 8 a.m. this shelling almost died down, and it was obvious that the enemy was withdrawing his guns.

Meanwhile the leading brigades of the 3rd Canadian and 11th Divisions had moved up from their assembly positions west of the canal in readiness to cross.

2nd Objective.

After a pause varying from 43 minutes on the right to 100 minutes on the left, the barrage moved on from the Red line, and the attack continued on Bourlon village, and the ridge running thence north-north-west to the east of Marquion (Green objective).

The 4th Canadian Division thus commenced the advance a little ahead of the 1st Canadian Division on its left, and the 1st Canadian extending its left in a convex line, its right brigade north-east and its left brigade north-north-east and parallel to the canal.

On the right line the 4th Canadian Division had hard fighting in Bourlon village, where machine gun nests and groups of riflemen fought stoutly amid the ruins. Here again tanks came to the assistance of the infantry and the attack swept on to the western edge of the wood.

On the left the 1st Canadian Division captured the Marquion line as far north as the village and the village itself. On the Green line—the two divisions halted for some 40 minutes at the foot of the final

slope of the ridge while the 3rd Canadian and 11th Divisions crossed the canal and moved into position with their heads on the general line Quarry Wood–Keith Wood. The leading brigade (34th) of the 11th Division came under fire from riflemen in Marquion and the marshes south of it, who had been passed over by the 1st Canadian Division. These men, with their retreat cut off by our advance, resisted stoutly, and were all killed or captured.

Following the 3rd Canadian and 11th Divisions came the field artillery batteries which were to cover the advance beyond the Green objective, and which crossed the canal at dry crossings rapidly improved east of Inchy.

3rd Objective.

Punctually according to programme at 10 in the centre, 10.30 on the extreme right, 10.40 on the extreme left, as worked out on the barrage map, the 4th and 1st Canadian Divisions pushed on.

The 4th Canadian Division was faced by Bourlon Wood, and, south of it, by the northern trenches of the Cantaing line, a southerly extension of the Marquion line. South of the First Army this line was an object of attack for the Third Army, and the advance of the right of 4th Canadian Division south of Bourlon Wood was, therefore, synchronised with that of the 57th Division XVIIth Corps, Third Army. The bulk of the 4th Canadian Division attack passed north of Bourlon Wood, and its advance behind the barrage reached the eastern edge of the wood, behind the Cantaing line at the same time as the Third Army attack (somewhat delayed by hostile gas) developed against Anneux. This co-operation materially assisted in the capture of the village and trenches.

Bourlon Wood itself was not entered by our infantry in the advance. It had been systematically shelled with mustard gas by the Third Army from the 17th to the 24th September with captured German guns and ammunition. The success of this action was seen later when the wood was entered, abandoned German guns testifying to its occupation and the effective nature of the gas bombardment.

On the left the 1st Canadian Division cleared the crest of the ridge between Bourlon Wood and Sauchicourt Farm without much difficulty, the chief opposition encountered coming from machine guns and riflemen in the small copses dotting the plain.

By 12.30 the Blue line was in our possession and the first phase of the attack was completed.

The front of attack had now increased from 2,500 yds. to 9,000 yds., but had not included the canal north of Marquion, or the defences on the ridge between Sauchicourt Farm and Oisy-le-Verger. The artillery measures which had been taken to safeguard this exposed left flank have already been referred to. But the wind, fresh from S.W. to W.N.W., had been favourable, and, in addition, the whole front of the XXIInd Corps along the Sensée River and the Trinquis Brook had been

subjected during the morning to a smoke bombardment by artillery, smoke bombs projected by the special companies R.E., and smoke clouds from captured German drums.

The heights of Oisy-le-Verger and north of the Sensée had been effectually screened.

Second Phase.

The 3rd Canadian and 11th Division had been moving forward, and the 11th Division now came up on the outer flanks of the 1st Canadian Division, which simultaneously closed inwards.

The 169th Infantry Brigade (56th Division) had also crossed the canal at Marquion, and relieved all Canadian troops between Sauchicourt Farm and the canal. In this movement the brigade had encountered small parties of the enemy still holding out in the enclosure north of Marquion, but, driving them out, was ready for the general advance at 3 p.m. At this hour the attack recommenced.

Attack of Canadian Divisions and Right Brigade 11th Division.

The advance of the Canadian Divisions and of the right brigade of the 11th Division was supported by field artillery which had been moved across the canal, acting on the lines of open warfare. A heavy artillery barrage from guns west of the canal supported this part of the attack, the guns lifting from definite lines at fixed times previously notified.

On the extreme right, the 11th Brigade, 4th Canadian Division, was met by heavy rifle and machine gun fire from Fontaine Village, and made little progress. On its right the 57th Division (XVIIth Corps Third Army) was still fighting in the Cantaing line, moving towards Fontaine, and till this village was taken further advance on the right flank of the First Army was inadvisable.

After dark the 3rd Canadian Division took over the 11th Brigade front.

The 12th Brigade 4th Canadian Division had a difficult task in advancing down the bare slopes towards Raillencourt and the Marcoing line in the face of machine gun and rifle fire, and its attack was checked by a counter-attack by the Guards Reserve Division. This Brigade, too, made little progress.

The 1st Canadian Division advanced another 3 miles with less difficulty, captured Haynecourt, and passing through several belts of enemy wire, established itself on the Cambrai–Douai road. This division had advanced 11,000 yds. (6¼ miles), fighting all day.

The 11th Division attacked north-east and north with two brigades on a diverging front. The brigades forced their way through a thick wire entanglement running east and west between the Marquion and Marcoing lines and the right brigade captured Epinoy.

Attack of 169th Brigade and Left Brigade 11th Division.

The left brigade advanced north behind the Marquion line against the commanding Oisy-le-Verger position and village, and its attack was co-ordinated with that of the 169th Brigade, 56th Division, which attacked parallel to the canal, and between it and the Marquion line. Both brigades attacked behind a barrage, differing in this from the attacks further south. These two attacks are therefore best considered together.

Both attacks started simultaneously at 3 o'clock, but the 169th Brigade advanced at 100 yds. in eight minutes, so as to clear out thoroughly the enclosed fields and copses in the low ground by the canal while the Left Brigade, 11th Division, advanced at 100 yds. in four minutes. The 11th Division was, therefore, soon échelonned well ahead of the 169th Brigade, threatening the retreat to the east of the garrison of the Marquion line and Sauchy Lestrée.

The 169th Brigade found considerable numbers of the enemy who had been trapped between the Marquion line and the canal, confused by the continuous barrages of smoke, H.E., and shrapnel which had been rolling backwards and forwards behind them, but these put up a good fight. The brigade captured Sauchy Lestrée, Sauchy Gauchy, and Cemetery Wood; and then, quickening their pace, came up in line with the left brigade of the 11th Division, which had halted for half-an-hour while the artillery searched and swept over the Oisy-le-Verger Village and rear. Oisy-le-Verger was captured, and at dusk the 11th Division line ran from the Douai–Cambrai road east of Epinoy, where they were in touch with the 1st Canadian Division in front of strong wire entanglements outside Aubencheul-au-Bac, to the edge of Bois de Quesnoy, close up to the banks of the Sensée Canal. Their advance, starting on a front of a mile, had ended on a 3½ mile front, and the division had captured some 700 prisoners and 40 guns.

The 169th Brigade, after stiff fighting in the marshes, had captured 500 prisoners, and reached the sunken road between Oisy-le-Verger and Mill Copse. They were in touch with the 11th Division on the south edge of Bois de Quesnoy, which was not entered, as we had filled it with gas. On the west of the canal patrols from the other two brigades of the 56th Division had pushed forward to the Palleul Marshes, but were unable to enter Palleul owing to machine gun fire.

4th Division.

Further west again the 4th Division established a small bridgehead across the Trinquis Brook west of Sailly-en-Ostravent in the face of considerable opposition.

Work of R.E.

A vital factor in the success of the day had been the work of the Engineers in bridging the canal. The success of all subsequent operations

was dependent on the rapidity with which communications across the Canal du Nord could be established. All preparations for the necessary bridges had been considered beforehand, plans prepared and dumps made, and on the evening of the day before the battle 145 tons of bridging material, loaded on lorries, were ready to move to the canal.

As soon as the leading troops cleared the eastern bank in the early morning, the work of cutting ramps for dry crossings and the laying of bridges was begun, the men working in some cases under machine gun fire. By the evening numerous trestle and pontoon bridges, infantry bridges and dry crossings had been completed. The construction of heavy bridges had also begun and was completed on the 28th.

Results of the Day's Fighting.

As a result of the day's fighting the First Army had forced the Canal du Nord on the whole front from Mœuvre to Palleul, had captured two powerful systems of entrenchments (Canal line and Marquion line), and the important tactical positions of Bourlon Wood and Oisy-le-Verger, and the ridge between these. Our line had advanced 5 miles on a front of nearly 9 miles, and a favourable position had been gained for future operations on Cambrai and the Escaut, securing the left flank of the Third Army which had also had notable success on our right.

6. Operations of 28th September.

During the evening and night 27–28th September the bulk of the Canadian Corps field artillery and a large portion of the heavy artillery crossed the canal and moved into position to support the further advance, which was resumed at 6 a.m. on the 28th September.

The 3rd Canadian Division, in conjunction with the 57th Division Third Army on their right, captured Fontaine–Notre–Dame, and with the 4th Canadian Division on their left captured the Marcoing line as far north as the Cambrai-Douai road, the 4th Canadian Division also seizing Raillencourt and Sailly.

The 1st Canadian Division, which was well in front, did not advance, but the 11th Division advanced into the south-western outskirts of Aubencheul-au-Bac, and on their left worked down to the Sensée Canal and joined hands with the 56th Division north of the Bois de Quesnoy. The 56th Division pushed through Palleul and established posts on the Sensée.

7. Results of the Battle.

During the day several hundred more prisoners and many guns were captured, bringing the First Army total since daybreak on the 27th to nearly 5,000 prisoners and 150 guns.

The three German divisions in the line on the morning of the 27th had been completely routed, two reinforcing divisions had been badly

mauled, and two further divisions were found to have been moved up for the fighting of the 28th.

Reinforcements coming from east of Cambrai and from near Douai had been harassed and delayed by the action of the R.A.F. and the heavy artillery on railway stations, roads and river crossings.

On our right the Third Army had had further successes.

Here the Canal du Nord battle may be said to end, and fighting merges in the capture of Cambrai.

The attack of the Second Army and French and Belgian troops in the north on this day was entirely successful, and the tale of victory was taken up on the 29th by the Fourth Army in the final breaking of the Hindenburg line.

Casualties.

It may be imagined from my narrative that there was no fight left in the Germans, and that the operations were of the nature of a walk over. Far from it; the First Army casualties are sufficient answer to that. In the fighting for the Canal du Nord, and the advance on Cambrai (up to 8th October) they were as follows—the great bulk being Canadian troops :—

Killed	172 officers,	2,328 other ranks.
Wounded,	547 officers,	10,184 other ranks.
Missing,	9 officers,	265 other ranks.
Total	728 officers,	12,777 other ranks.

8. Reasons for Success.

To what then can we ascribe our success in this difficult operation? I think the main factors of success were first and foremost the superb confidence and matchless fighting spirit of the men in the ranks, and the bravery and fine tactical leading of the regimental officers. In those days it seemed necessary only to order a position to be taken and it was done; there seemed hardly any limit to what could be asked of the troops.

But beyond this there were other factors. The elaborate preparations for attack on the north of the Scarpe—the feints, raids, bombardments, Chinese attacks, and small operations actually carried out—all led to the mystification and misleading of the enemy as to the point of attack. To the unselfish co-operation of the divisions of the XXIInd and VIIIth Corps, the Canadian Corps owed much, and their Commanders acknowledged it generously.

The time available for preparations rendered possible elaborate artillery arrangements which worked to perfection. Great as was their material effect, the moral effect of the various barrages and bombardments in bewildering the enemy, especially on the northern flank, was even greater; and the *morale* of the German infantry, already greatly

affected by the defeats of August and September, was not proof against the terrible concentration of our artillery, backed up by the steady unwavering assaults of our infantry and tanks, and but poorly countered by their own guns.

Time also was in favour of the Army Corps, Divisional, and Brigade Staffs; and if there were many difficulties to be encountered, it may be fairly said that there were few—very few— which were not foreseen and prepared for.

The German was not the man he was, but that is not to say he was anything but a formidable enemy.

The conformation of the ground enabled direct observation of the progress of the attack. Commanders were able to direct the move forward of reserves without committing troops to action in ignorance of the exact situation; and the artillery were able to observe accurately the advance of the infantry which they were supporting and to engage targets of opportunity.

The successful passage of tanks over the crossings of the canal was an essential part of the operation.

If Lord Horne was anxious about the success of so formidable an undertaking, he knew that he had under his orders Commanders, Staff, and troops who had the habit of victory, and whose skill and knowledge of their work and of each other were the result of much experience and fighting together; intimate co-operation was assured.

Finally, I would pay a tribute to the magnificent fighting qualities of the veteran soldiers of the young army of Canada, on whom fell the great weight of the operations I have described.

DISCUSSION.

COLONEL R. J. F. HAYTER (General Staff Headquarters, Western Command): Mr. Chairman, Ladies and Gentlemen, I am afraid that I have really nothing to say, as I cannot add to the most interesting lecture that we have just heard. But, having had the honour of commanding one of the Canadian Infantry Brigades which took part in the operation, I feel that I should like to say, on behalf of the Canadians, how deeply grateful, I am sure, they would have been for his appreciation of their services if they could have been here to listen to this lecture; the operations went exactly as General Anderson has told us, and, without going into a mass of detail, for which there is no time available at the present moment, I do not think I can add at all to what the lecturer has said.

LIEUT.-GENERAL SIR A. GODLEY: Mr. Chairman and Gentlemen, as I commanded the 22nd Corps, I think I must say a word after listening to the most interesting lecture that has been given by General Hastings Anderson. There are just one or two points on which I should like to comment. I should like in the first place most emphatically to endorse what he said about the men and their leadership by the young officers. You have seen to-day photographs of the swampy, marshy ground that had to be covered by the First Army. I think it ought to be generally known that it was exceptionally difficult to cross that ground. The 56th Division, one of the Brigades of which made our attack, was commanded by that most

gallant and distinguished soldier, the late General Sir Amyatt Hull, whose arrangements for it were most admirable; but if it had not been for the extraordinarily good leadership on the part of the young officers it would not have been possible successfully to carry out the difficult and complicated manœuvre with which they were charged, namely, to cross the canal, then turn at right angles and advance at right angles, clearing up the very difficult piece of marshy swampy ground such as you saw in the photographs. It was by no means a walk-over, as the lecturer has said. I know the Huns that the First Army met fought very stoutly, and it all emphasises what the First Army did on this particular occasion. I should also like to endorse what the lecturer has said about the work done by the Engineers on that part of the front where my Corps was. It was quite admirable. There is only one other thing I should like to say, namely, that, as I had the honour of commanding a Corps in the First Army, I can say what naturally General Lord Horne and General Hastings Anderson cannot say themselves, and that is to pay a tribute to the conception of the operations on the part of the Army Commander and the orders and arrangements for them made by General Hastings Anderson, his Chief Staff Officer, and his Staff, which, of course, were greatly responsible for the success of this well-planned and highly-successful operation.

LIEUT.-GENERAL SIR BEAUVOIR DE LISLE: I had not the good fortune to be fighting in the particular area described by the lecturer this afternoon, owing to the fact that on the day the operation took place I was in Lord Plumer's Second Army further north. The object of the lectures delivered at the Institution is not only instruction or edification of those in this Hall. The report of the lecture and the discussion goes out throughout the whole of the Empire, and I think something ought to be said as to what we learn in this Hall whenever a lecture is given. A point that I think we might hear more about is the part played by the Tank Corps in these particular operations. There appears to be very little doubt that the tank is going to play a far larger part in the future than it has done in the past. I was talking to a French officer after lunch to-day, and he told me that in the French Army they now have 11 regiments of tanks, each regiment containing three battalions; that is to say, there are now 33 tank battalions organised in the French Army. I am told that the American Army have gone even further still in connection with the development of their tank battalions. If, therefore, any officer present at the meeting who is connected with the tanks can tell us a little about the part the tanks played, and the part they might have played had we possessed the improved tanks which we now have, it would be of the greatest possible advantage, because it would enable the coming Army to have a base for their plans both in manœuvres and in future wars.

LIEUT.-COLONEL W. D. CROFT: General de Lisle has raised the question of tanks crossing canals and that sort of thing in the future. It is a very big problem. Sooner or later an Army is bound to meet a river, and, as everybody here knows, the tank which has now been evolved is one that will swim. It must be borne in mind, however, that, so far as crossing a canal is concerned, it is dead water, so that it is a comparatively simple problem. It is a very simple problem to jump into an unfordable swift river, such as the Lys at Harlebeke, but it is another problem to get out of it. I should like to ask how the tank is going to get out of a swift running stream. The point is this: that the two horns have to get square on to the work to climb out, and if there is a fairly swift running stream, the tank will drift with the current; only one horn will function, so that the tank will constantly slip back into the water. Of course, you can have another tank higher up the river to take the weight of the water off, or you can have stays or braces.

A man can then swim out from the tank, get ashore, and hitch us up somehow in that way. That is a training matter which we shall have to begin thinking about soon.

THE CHAIRMAN: If no one else will say anything, I will call upon General Anderson to reply, particularly from the point of view of whether he can add any information with regard to the part actually played by the tanks in the operation.

MAJOR-GENERAL W. H. ANDERSON, in reply: I did not say much about the tanks, because this was not what you may call essentially a tank battle. As I have said, the majority of the tanks were required for the Fourth Army, which, speaking from memory, had something like 250 tanks at this period. The First Army were allotted at that time one battalion of tanks, the Seventh Battalion. Those tanks had been very fully employed at the breaking of the Drocourt–Quéant line on the 2nd September, and in the operations leading to the Canal du Nord up to the 4th or 5th of September. But tanks cannot be used every day; they are mechanical weapons and not only do they require repair but the men inside them undergo, or underwent at that period, a very heavy mental strain, which meant that they could not be used constantly. Lord Horne therefore only disposed of 24 tanks actually for this particular operation, and that they did good service I have tried to tell you. They got across the dry part of the Canal and they were invaluable on the right flank for helping the attack on Quarry Wood, which was getting sticky, and also in helping the Fourth Canadian Division at Bourlon village. Endeavours had been made for a week before to try and find the places where the tanks could cross, and in fact they were able to cross at those places. Arrangements had also been made by their commanding officer that if necessary one tank should be forced down into the bed of the Canal, in order that another might go across on the top of it. The tanks were determined to get there somehow, and they got there, but the battle was not actually one regarding which a detailed study of the operations of tanks could have been undertaken this afternoon. We only had the old Mark C tank, and, generally speaking, the First Army was not dowered with sufficient tanks for us to be able to draw wise lessons for the future from their employment.

THE CHAIRMAN: In considering the operations of the First Army during the autumn of 1918 it is necessary to have a clear understanding of the *rôle* of that Army. You will remember that the strategic plan decided upon by the Allied Commanders-in-Chief was: American and French—converging attack on Mézières; British—converging attack on Maubeuge; Belgian and Allied Forces in Flanders—converging attack on Ghent. Sir Douglas Haig's decision was to deliver his main attack with the Fourth and Third Armies, the primary roll of the First Army being to cover the left flank of the Third Army. To carry out efficiently the duty of protecting the left flank of the Third Army it was necessary to attack and dislodge the enemy on that flank. It was made clear to the First Army Commander that the number of divisions and the amount of artillery available for the First Army were limited, that he could expect no increase, and that he must carry out his task as best he could with what he had at his disposal. I mention this in order that it may be understood that it was not from choice but from necessity that the First Army attacks during the period 26th August to 27th September were delivered on so narrow a front and with an exposed flank. It appears to me that two points arise from the lecture upon which criticism is justified, the first being the situation on the left flank. This flank rested, to begin with, on the strongly organised position of the Vimy Ridge, garrisoned lightly enough by the Eighth Corps, none

too strong in numbers and strung out on a long front. As operations progressed the flank gradually extended along the line of the River Scarpe, the Trinquis Brook and the Sensée marshes, until at one time, 12th October, it attained to some 15 miles. Parallel to this flank, at a distance from enemy positions of from 3 to 6 miles, ran the Arras–Cambrai road, the main line of communication and supply of the First Army. It may fairly be said that such a situation entailed considerable risk, and I admit it; but, as a matter of fact, the risk was not so great as it appears at first sight. The Trinquis Brook and the Sensée marshes—obligingly flooded for us by the Germans—rendered attack in force very difficult. The chief danger was that German guns would interfere with the road; but the German Commander was evidently imbued with the idea, in which we encouraged him, that an attack upon him was imminent north of the Scarpe. For his own protection, therefore, he flooded the marshes and withdrew his guns to extreme ranges from the crossings. This left the main road in comparative peace. We on our part employed our artillery in strength in the protection of this flank, carrying on very active counter battery work. I am ready to admit that this flank was a source of anxiety and the provision of troops for its protection added to our difficulties. The second criticism to which I refer is: Was the plan of operations on 27th September sound? Was it sound to base the plan on the passage of six divisions through a bottle neck 1½ miles wide? The objections are obvious—the possibilities of failure with heavy loss evident. Here are the considerations which influenced the adoption of the plan. We had plenty of time to make all preparations. Reconnaissance was thorough and maps correct. The Staffs were efficient and well accustomed to working out plans thoroughly and in detail. The Regimental Officers and N.C.O.s and men knew their job, and *morale* was very high. During the past month every prepared attack had gained at least its second objective. There was every reason to feel confident that with the troops and material at our disposal we should be successful in the first stage and gain the blue line. If, therefore, the advance of the supporting divisions was delayed until plenty of time had been allowed to make sure that the leading divisions were firmly established on the blue line, then the danger of confusion was much reduced. With this object in view it was decided that the second phase should not commence till 3 p.m. Also, experience had proved that, shortly after a successful attack on the first portion of a German fortified system, hostile shelling ceases for a time, whilst guns withdraw to retired positions. The supporting division might reasonably anticipate that they would not be exposed to much shell fire whilst crossing the Canal. Further, the success of the first attack would gradually clear the Canal northwards and enable bridges to be thrown and the number of crossing places increased. Such were the considerations which influenced the plan, and the result justified them.

It is an axiom that a military operation should be as simple as possible, and the larger the operation the greater the need for simplicity. No one can claim that the operation under consideration was simple—indeed, it might without contradiction be termed complicated—and the fact that it was carried through successfully speaks very highly for the quality of the Staff work in preparation and for the execution by Commanders. As regards the Staff work, where all did so well and so much it is invidious to name individuals, but it is certain that the Chief of the Staff sets the pace, and that, unless his orders and instructions are clear and precise and exhaustive, the work of the Staffs of lower formations will be hampered. The lecturer was Chief of the Staff of the First Army, and the success of this operation was largely due to his clear head and excellent organisation. In addition, the greatest praise is due to the work of all Commanders and Staffs concerned, to their careful consideration of details and to the thoroughness of their

preparations and arrangements; and to Regimental Officers, Non-commissioned Officers and men for the zeal, energy, devotion and self-sacrifice displayed in carrying through the tasks set them. Whilst in no way deducting from the merits of the 11th and 56th Divisions, both of which had very difficult tasks and carried them through right well, I must say a special word for my old friends of the Canadian Corps. For more than two years I was closely associated with them. No one could wish to command better troops. Their Commander, Sir Arthur Currie, had brought his corps to a very high stage of efficiency. Their spirit was immense. I think at this time the troops of the First Army looked for success as a matter of course, and considered that no German troops could stand in front of them. I think they were right.

In the study of the Great War it is very desirable that we should not lose our sense of perspective. There is a tendency, a strong tendency, a dangerous tendency, to model our ideas of war on our experiences of four and a half years in France and Belgium, and to allow the ideas thus formed to influence us unduly in our task of reconstituting the British Army. The odour of " trench warfare " is still too strong in our nostrils. We lean to the tactics employed at the close of the war in France and Belgium, forgetting the experiences of the first few weeks there, and of operations in other parts of the world, such as Palestine and Mesopotamia. We must remember that the conditions of four years' war in France and Belgium were abnormal and unique, and are unlikely to occur again—certainly not until both Armies have failed to force a decision by mobile warfare. Thus, when you study an operation such as that with which the lecturer has dealt to-day, you must realise the extraordinary conditions under which it was carried out. An organised battle area, adequate and safe communications, stupendous artillery, unlimited ammunition, a vast fleet of aeroplanes with complete mastery of the air, tanks (not many certainly on this occasion, but the enemy had none), gas, smoke, accurate maps, complete knowledge of the hostile position, complicated barrage systems, vast accumulations of bridging material, with adequate trained personnel, food, water, etc., a sledge-hammer battle, simplicity of tactics. Where are you ever going to find such conditions again? I mention all this to emphasise my point that in reorganising our small Army and in bringing our tactics up to date and in the conduct of our training we must not lose our sense of perspective. We must clear our minds; we must sit down and think hard. What does our Army exist for? Certainly not for war on the scale of the Great War, nor yet for war on what used to be termed " Continental scale." It exists primarily to preserve law and order throughout the British Empire. It has been said that no day passes upon which the British Army is not fighting somewhere or other throughout the Empire. The British Army exists for small wars, and it is for the small war that we should train and for which our armaments, etc., should be adapted. Let us get back to the principles of 1914. Let us train and equip our Army for " open warfare " in any part of the world. Let us by all means take advantage of the innovations of modern science, but let them be adjuncts. Let us realise that we must be ready to fight, and fight effectively, in any part of the world with what we have and what we can get there. We cannot expect to operate in " organised battle areas."

Ladies and Gentlemen, I conclude by asking you to join with me in thanking General Anderson for his lecture to-day. I am sure the description he has given of the battle could not have been clearer or more lucid, and I venture to say that it must have been most interesting to all of you. General Anderson is a very busy man: he went through the whole of the war, and then, without any rest, he re-organised the Staff College. He has added to his many duties the task of pre-

paring this lecture for us this afternoon, and I am sure you will all recognise that that is a very great kindness indeed on his part. I ask you to join with me in passing a very hearty vote of thanks to General Anderson for his lecture to-day.

The resolution of thanks was carried by acclamation.

GENERAL SIR A. GODLEY: I have been asked to propose a very hearty vote of thanks to General Lord Horne, not only for so kindly presiding over the meeting to-day but for having set before us in such an interesting and instructive manner the lessons of this most successful battle.

The resolution was carried by acclamation and the meeting terminated.

THE NEW RESPONSIBILITIES OF THE BRITISH EMPIRE CREATED BY THE ASSUMPTION OF MANDATES IN THE MIDDLE EAST, AND THEIR STRATEGIC SIGNIFICANCE, WITH SPECIAL REFERENCE TO THE DEFENCE OF INDIA.

By LIEUT.-COLONEL F. W. BARRON, O.B.E., R.A., General Staff.

On Wednesday, 8th March, 1922, at 3 p.m.
MAJOR-GENERAL SIR W. S. BRANCKER, K.C.B., in the Chair.

THE CHAIRMAN: Ladies and Gentlemen, I have much pleasure in introducing to you Colonel Barron of the General Staff, who is going to talk to you about Iraq, which is one of the most interesting problems in the Empire at the present moment. He is exceptionally well qualified to speak to you on this subject as he spent several years soldiering there, and he is now in the War Office on the General Staff dealing with the intricate problems of the Middle East.

LECTURE.

THE subject disclosed by the heading of this lecture is, as you will see, one of considerable magnitude. It is impossible in the space of one hour to do more than give a very brief outline and to indicate quite roughly the principal points of the subject. In other words, I can only hope to give you material to assist you in thinking out this problem yourselves.

To commence with, I think it is very desirable that we should have quite clearly in our minds exactly what is the meaning of the word "Mandate." It has been brought home to me plainly on many occasions, from articles in the press and from conversations with various "men in the street," that the meaning of this word is not clearly understood. Many people seem to think that it is some sort of an expression for a Protectorate or a Suzerainty. Now this, of course, is the very thing it is not. As the outcome of the war various regions have been wrested from the enemy Powers, and these regions, owing to the fact that they have never tried it, are quite unable to govern themselves. During the period of military occupation by the Allies no question of government arose; but as soon as the war ended, and the Powers who were in temporary occupation found it incumbent upon them to withdraw, it was necessary to decide how these regions were to be prevented from falling into a state of complete chaos. It was, therefore, arranged that certain of the

Allied Powers who had long experience of government should be made responsible for the administration of certain regions, and lead them by the hand until they are fit for self-government. This solution was arrived at in order to avoid any charge of "land-grabbing" against individual Powers, and to lead up to the adoption of the modern theory of "self-determination" on the part of the regions so occupied.

As regards the Mandates which have been accepted by Great Britain, we are here only concerned with two. Those are the mandates for Palestine and Iraq. And now, at this first mention of the name Iraq, I should like to digress for a moment and speak about the reason for the change of name of what always used to be known as Mesopotamia. At the time when the name was changed a large number of the more popular newspapers endeavoured to use it as a stick to beat the Government, and stated that it was nothing but camouflage, introduced so that the man in the street should lose sight of our enormous commitments in Mesopotamia when hidden under the name of Iraq.

This charge has actually been repeated within the last few days, when a certain well-known and prolific writer made the following statement in an article published by a Sunday newspaper:—

"These word-spinners always think they can succeed by juggling with the dictionary. Mr. Winston Churchill, when he held his great Durbar at Cairo last year, conceived the bright idea of hoodwinking the British public by changing the name of Mesopotamia to Iraq. The Mesopotamia Estimates were anathema to the taxpayer, but Mr. Churchill apparently believed that the public would not notice if they were asked to pay many millions a year for a mysterious place called Iraq. Yet it is the same old Mesopotamia whatever it may be christened."

As a matter of fact Mesopotamia is not the true name of the territory that was occupied at all. "Mesopotamia," in fact, covers the whole of the country between the two great rivers, the Tigris and the Euphrates. That is to say, it includes a very large portion of the hinterland of Syria and Anatolia, and does *not* include the country lying between the Tigris and the Persian border. "Iraq," on the other hand, is the correct geographical name for the three vilayets, or political divisions, of the occupied territory.

Let us now consider for a minute the pre-war conditions in the territories we are discussing, and those adjacent to them. Before the war there was no British territory or even Protectorate between the North-West Frontier of India and the Mediterranean. In those days the chief danger to India was always considered to be Russia, and Russia had for many years been advancing by slow degrees towards India. And, in furtherance of her purpose, she had constructed many strategic railways, such as the Caucasus railway, and the Trans-Caspian or Central Asian railway, all leading towards the northern frontiers of India. She had also been spreading her influence rapidly southwards through Persia, thereby establishing a direct threat to the southern portion of the North-West Frontier *viâ* Baluchistan. With the object of putting an end to

this latter threat we had, in 1907, come to an agreement with Russia about Persia. This agreement included the division of Persia into three spheres. The northern, known as the Russian Sphere of Influence, extended from approximately Kasr-i-Shirin, through Isfahan, to the junction of the Afghan and Persian borders near Kushk. The southern, or British, Sphere of Influence extended from Bandar Abbas through Kirman to the Afghanistan border south of Herat. In these spheres Russian and British influences were supreme. In the central portion neither Power had any official position. India, therefore, was defended, so far as the southern portion of the North-West Frontier was concerned, by a railwayless Persia, backed by a British sphere of influence. Her defence on the northern portion of the frontier was a friendly and railwayless Afghanistan, assisted by the tremendous physical difficulties of the country. In the years succeeding the Anglo-Russian agreement Germany began to take a hand in the Eastern problem, whether in view of her eventual determination to make war against Great Britain or for purely commercial purposes, it is not for me to say. But, in pursuance of her scheme, she devised a railway running from Constantinople to the head of the Persian Gulf. To this enterprise we, of course, being at the time at peace with Germany, could not raise any definite objections; but, with a view to safeguarding ourselves, we opposed the placing of the terminus at Basrah, *i.e.*, in Turkish territory, and demanded that it should be placed at Koweit. Our reason for this was that the Sheikh of Koweit was intensely pro-British, and, with the terminus of the railway in his territory we should, consequently, in case of war, have been in a position to exercise some control on the use of it.

When the war broke out the construction of the Anatolian section of this railway was nearly complete as far as Aleppo, where it joined the railway running in the hinterland of Syria and Palestine down to the Hedjaz. There were, however, two portions incomplete—one through the great Taurus range of mountains, and the other through the Amanus range. A portion of the railway from Aleppo towards Mosul had also been constructed, and another portion had been completed between Samara, on the Tigris, and Baghdad. Before this railway, therefore, could be of any real value in a military sense for operations in Iraq, or in connection with operations further east, a very large amount of difficult engineering work remained to be done. The railway, in fact, was completed up to Nisibin during the war, but no further extension has been undertaken since the Armistice.

After this very brief survey of the pre-war situation, I should now like to turn to post-war conditions, *i.e.*, the conditions at the present day.

At the end of 1918, when the Armistice with Turkey was concluded, British forces were in occupation of Palestine, Syria, parts of Cilicia, and the whole of the three vilayets of Iraq. In Persia, Russian influence had entirely disappeared owing to the collapse of the Russian armies after the Bolshevik revolution, and had been replaced by British influence, which was paramount all over Persia.

During the years succeeding the Armistice certain changes and developments have occurred.

On the West we have withdrawn completely from Cilicia and Syria, for both of which countries the French accepted Mandates, but have now returned Cilicia to its former owners, the Turks.

We have set up in Palestine a British Government administration under the conditions of our Mandate. How long it will be before we can fulfil our Mandate and give self-government to Palestine it is difficult to say, because we have adopted the policy of making in that country a " national home " for the Jewish race.

It is important to notice the exact wording with which this policy was defined. We did not say that we would make Palestine *the* national home of the Jews, but that we would make in Palestine *a* national home for the Jews. It is perhaps unfortunate that the difference in wording is so slight, as out of it has grown up a bitter dissension. There can be no doubt that the more extreme of the Zionists have not only expressed their intention of " making Palestine Jewish as England is British," but that a large number of them have endeavoured to translate this intention into fact. A very large number of Jewish immigrants have entered Palestine. They have come from all parts of the world, and it is an undoubted fact that many of them who have migrated from Russia have pronounced Bolshevik tendencies.

The Arab, who is the aboriginal owner of the soil, does not appreciate the fact that these extreme views are not in accordance with our expressed policy, but thinks that this Jewish immigration is part of a deliberate plan to oust him from the country which he and his forefathers have possessed through the centuries. As a result, a very difficult situation is created for us. It is obviously impossible to set up a Government of Arabs, as they would immediately turn out the Jews, and thus our obligation to the Jewish race would be stultified.

It is equally impossible to set up a Government of Jews, as they would immediately squeeze out the Arab, and thus our principle of " self-determination " would go to the wall. And Jew and Arab will not, at present, combine in order to govern. Consequently we have only one alternative, and that is to retain the Government in our own hands, hoping, like Mr. Micawber, that something will turn up.

To turn to Iraq. We have now withdrawn from all the territory which we occupied at the Armistice, other than that included in the true geographical boundaries of the three vilayets. Some eighteen months ago we set up an Arab Council of State under the presidency of the British High Commissioner, with a view to teaching the Arabs to govern themselves. Obviously this could only be a temporary expedient, and something more definite was necessary before the country could become actually self-governing. Among other things, a head was required, and therefore, about six months ago we introduced Feisal to their notice as a candidate for Kingship. He was accepted as King, and an Arab Government has now been formed (with the British High Commis-

sioner in an advisory capacity only, subject to certain rights of veto), and has made such progress that it is hoped that before long we shall be able to conclude our obligations under the Mandate, and that the country will be ripe for independence.

As regards Persia, the situation is not so bright. Our influence in Persia may be said to have completely disappeared. This has been due partly to a vacillating policy, which was of course at once used as an instrument by Bolshevik propagandists, and very largely to economic conditions which compelled us to withdraw our troops, and to refuse any longer to finance Persia, which had been for a long time dependent on us for money. The loss of our influence in Persia is, of course, extremely serious; not so much for its direct effect in that country, but owing to the consequent loss of prestige which we have suffered throughout the East.

Now, before going any further I want to try to answer a question which we have seen so frequently asked in the press, *i.e.*, " Why do we remain in military occupation of these countries—Palestine and Iraq—at all? " In Palestine we remain, as I have just said, in pursuance of our policy of establishing a national home for the Jews. In Iraq we remain for three principal reasons :—

Firstly, because, having set up Feisal as King and established an Arab Government, we cannot honourably withdraw all support until the new-born child has attained some little strength.

Secondly, because of the still further blow to our prestige throughout the East which would be caused by a precipitate withdrawal; and

Thirdly, because the British Empire has poured out millions of money and many thousands of lives in this territory, and there is thus a considerable amount of sentiment connected with it.

These reasons, you will observe, are either political or sentimental. From the purely *military* point of view, there is only one reason for maintaining a garrison in Iraq, *i.e.*, to protect the Ahwaz oil-fields against any attack through Iraq. This could be done without keeping any troops north of the line Nasiriyeh–Amara–Persian border.

These oil-fields, situated to the north-east of Ahwaz, supply a very large percentage of the oil-fuel for our Navy and Mercantile Marine They are entirely under British control, and would be, in time of war, one of the very few sources of supply of oil which are under such control. The importance, therefore, of protecting them from attack or interference is sufficiently obvious. They are, in fact, a vital Imperial asset. Were it not for the necessity of safeguarding them there would be no purely military object in maintaining any troops in Iraq at all.

I now want to discuss the subject of *railway communications*. Before the war there were no railways in Egypt east of the Suez Canal, nor any railways in Palestine. There were no railways in Iraq other than the short stretch of the German Baghdad railway some 70 miles in length between Baghdad and Samara. During the war a railway

was constructed from Kantara on the Suez Canal up to Rafa, the Egyptian boundary, and thence along the coast of Palestine, with branches leading to Jerusalem and other places, one of these branches connecting with the Hedjaz railway at Deraa. Since the war some of these have been done away with, but connection between Egypt, Jerusalem, Deraa and the coast towns of Palestine still exists. In fact, the desert, which covered the Canal and Egypt, has been bridged. In Iraq, during the war, a very large number of railways were constructed for the support of the Army. The first of these, of metre gauge, ran from Basra to Nasiriyeh. After this was completed, another railway, also of metre gauge, was built from Basra to Amara. After the capture of Baghdad a metre gauge railway was built from Kut to Baghdad, and this was later extended up to the Persian border near Kasr-i-Shirin, with a branch to Kifri in Southern Kurdistan. As the forces advanced northwards the old German standard gauge railway was extended until eventually it reached Shergat, which is some 70 miles south of Mosul. A standard gauge railway was also built from Baghdad to about Hit on the Upper Euphrates, and another from Baghdad to Hilla on the Middle Euphrates. Finally, as a result of investigation by railway experts specially sent out for the purpose, and with an eye to the commercial possibilities of developing the rich country of the Middle Euphrates, the gap between Nasiriyeh and Hilla was filled up, and a through railway was established between Basra and Baghdad *viâ* the Euphrates. This railway was constructed on metre gauge. Of these railways nothing now remains with the exception of the Basra–Baghdad railway, the Baghdad–Shergat railway, and the railway from Baghdad to the Persian border. All the others have been, or are about to be, pulled up, since they had little commercial value, and are no longer required for purely military purposes.

So much for actual railway construction. Let me now say a word as regards proposals for the future.

Even while the war continued the obvious advantages of connecting Iraq and the Persian Gulf with the Mediterranean were being considered. The first idea for post-war development was the obvious one—that is, to fill up the gap between Nisibin and Shergat. Another proposal, which was put forward by General de Candolle as part of his scheme of railway development throughout the Middle East, was to connect Baghdad with Alexandretta by a railway following the course of the Euphrates. The former of these two schemes is, of course, still within the bounds of possibility; the latter has, I think, died a natural death.

But there is a factor which very closely affects the question of the alignment for any Persian Gulf–Mediterranean railway, and that is the agreement which has been arrived at between the French and ourselves as regards our respective spheres of influence in Northern Arabia. Under this agreement which was arrived at in December, 1920, the boundary line between the French and British spheres passes approximately along the north-west border of Iraq and thence direct across the desert to the actual frontier between Syria and Palestine. It will thus be seen

that, under either of the two before-mentioned schemes, the greater part of the railway would lie in French controlled territory.

It is obvious that for Great Britain, both from a commercial and military point of view, it is very desirable that the railway as finally constructed should lie throughout its length in territory which is under British control. During the past 18 months, therefore, reconnaissances have been made for a railway which would cross the desert between Haifa and Baghdad. The suggestion was that alongside the railway there should be constructed a pipe line by which the Mesopotamian oil could be led direct to the Mediterranean; and it was also proposed to establish a trans-Arabian air route which should follow the same alignment. The scheme for the railway and pipe line is temporarily in abeyance, partly for lack of funds and partly because of the uncertain conditions in Northern Arabia as between ourselves, the French, the Arabs and the Turks. The air route has, however, already been established and is actually in working, and by its means official mails from Iraq, which used to take at least five weeks to arrive in London, are now being delivered in less than a fortnight.

As regards the actual alignment of the railway between Haifa and Baghdad, two main routes have been considered. One, which crosses the Hedjaz railway, approximately, at Deraa, and goes straight across the desert to about Ramadi, on the Euphrates. The other, which crosses the Hedjaz railway well south of Deraa, and proceeds down the Wady Sirhan Valley. It is obvious that, from a military point of view, this southern alignment is the better, as lying more completely within the British sphere of influence. Commercially it would appear to be better as it taps the Wady Sirhan, which is the only rich country in that part of Arabia. From an engineering point of view it is, I believe, better, since it avoids the high ground north of Jauf, although it is understood that there are great engineering difficulties at the actual point of crossing the Jordan. From a financial point of view it is perhaps the least satisfactory, owing to its being longer.

Should this southern alignment be eventually selected, a very important point which will arise will be as regards the terminus in Iraq. The scheme which I believe holds the field at present is to bring the new railway into Iraq somewhere in the direction of the Middle Euphrates—that is, about Kerbela or Nejf—and to make the terminus at Baghdad. The alternative would be to join it to the existing railway somewhere near Ur and to make the terminus at Basra. Commercially, the claims of the former are undoubtedly great. Baghdad is the political capital of the country and is on one of the main trade routes from Persia, and the Middle Euphrates area is probably the richest agricultural district of Iraq. From the military point of view, however (and we must remember that this railway, if constructed, will be very largely a strategical railway), there are certain grave objections to this scheme. The Middle Euphrates area contains the two great Holy Cities of Iraq. It is now, and always has been, the great centre of unrest and religious agitation, and to bring

the railway into this area would almost inevitably lead to its being completely useless in the event of trouble in Iraq. Moreover, the natural features in this district—rivers, streams, canals, irrigation cuts, etc.—are such as to make the interruption of a railway very easy, and its repair, when damaged, extremely difficult. Hence we must, I think, from the military point of view, vote for the second alternative—that is, for the terminus to be placed at Basra, and regard river navigation on the Tigris as our only really reliable channel of communication with Baghdad, though the Euphrates Valley railway would still, of course, exist for this purpose in normal times

The adoption of Basra as the terminus would also fit in with another railway project that has been put forward, *i.e.*, the connection of Basra with India by a railway through Persia. Many suggestions have, from time to time, been put forward for railway development in Persia. The Persians, however, have apparently always suffered from the Oriental suspicion of a railway, and we ourselves have always opposed the extension into Persia of any of the Russian strategic railways.

Towards the end of the war two proposals were put up, again by General de Candolle, for railway development in Persia. The first involved an extension of the existing railway between Baghdad and the Persian frontier, through Kermanshah and Hamadan to Teheran, with a branch running by Yezd and Kirman to join up with Quetta *viâ* the existing Nushki Extension railway. This alignment would involve a great deal of very heavy engineering work, and, from a strategical point of view, I think, we must oppose it, since there would be only a short section remaining to be completed between Tabriz and Teheran in order to provide through communication to the Indian frontier from the Russian Caucasus system.

The alternative suggestion is to construct a railway from Basra, following the coast of the Persian Gulf, as far as Chahbar, and thence, either northwards to connect with the Nushki Extension railway, or to continue along the coast as far as Karachi. From a strategic point of view, this railway would undoubtedly be very valuable in that it would greatly decrease the time taken between Basra and India. In the present temper of Afghanistan it would probably be advisable to adhere to the all-coastal portion of the scheme. Commercially I have no doubt that there would be grave objections to the spending of money on such construction, since a break of gauge would, in any case, be necessary at Basra, and the argument would be that it would be cheaper to ship merchandise from Basra to India than to send it by rail.

I now pass to the question: "How do these mandated territories affect the defence of India?" Speaking plainly, they have no direct effect on India at all. We have all read numerous articles by amateur strategists in the press who suggested that in some mysterious way Iraq is being used as an outpost for the defence of India. If it is, I can only say that it violates one of the canons of selection of an outpost, *i.e.*, it is so far distant from its main body, and so completely isolated,

as to preclude its exercising any definite function of protection, and to be exposed to defeat before support could arrive. But a little consideration will show that this outpost theory has no foundation in fact. Who are India's possible external enemies? They can only be three, namely, Afghanistan, Bolshevist Russia, or Turkey. Persia I leave out of account, as for military purposes, her forces are negligible. It is quite clear from the map that, should Afghanistan wish to attack India, no British force in Iraq could have any effect whatever. As regards Bolshevist Russia, I think it is obvious that if she wishes to attack India (I do not enter into the argument whether she *could* do so) she would not proceed by way of Iraq, but would go direct, and attack either from the south-east corner of the Caspian, through Afghanistan, or by the Trans-Asian railway. Otherwise she would commit herself to the enormous undertaking of marching through a country devoid of any railways and involving so much land transport as to preclude the support of fighting forces. As regards Turkey, the only *raison d'être* for an attack by her on India would be an attempt of the Mohammedan nations to combine to drive out the Christian peoples from territories held by them. Should such an event come to pass it is even then hardly conceivable that, in view of the enormous number of Mohammedans in India (and we should have in this case to include Afghanistan), it would be necessary for Turkey to try to send an army to India at all, and, even if she did, the distances to be traversed through a mountainous and difficult country, with no system of railways, would render the operation almost impossible. We may therefore also ignore a direct attack by Turkey upon India.

Consequently it is true to say that Iraq has no direct influence in a military sense in the defence of India. Even more must this be the case as regards Palestine. Indirectly, however, there is the chance that both these countries might have an effect on the problem, as follows: If we assume an attack by Islam on our position in India, whether carried out by internal upheavals or by warlike operations undertaken by Afghanistan, it is quite conceivable that the Turks might simultaneously attack our position in Palestine, and still more in Iraq, with a view to compelling us to reinforce those countries, and thus infringe one of the greatest principles of military science, by making unsound detachments from the main theatre.

In such a case, what should we do?

I am not here considering the political aspect of the matter but am merely suggesting what ought to be our military policy. Surely it is obvious that, with a threat against the safety of India and all that its loss would mean to the Empire, it would be criminal folly to detach troops to safeguard territory in which we have no military, and only a problematical financial, interest. We *must* safeguard our vital Imperial interests—*i.e.*, in Iraq the Anglo-Persian oil-fields, and in Palestine the frontier of Egypt, or the Mediterranean end of the Trans-Arabian railway; but this should be the limit of our military commitments.

A retirement under pressure, however, as far as would be compatible

with the carrying out of this task, would not only be repugnant to our British nature but it would also entail grave political disadvantages. It would mean disavowing our obligations, breaking faith with the new King whom we have set up in Iraq, and with the Jews whom we are establishing in Palestine. It would mean removing from both countries that stable form of government which we have been working for three years or more to establish, and the throwing back of both countries into complete chaos, or of restoring them to Turkish rule (which, it must be admitted, was entirely adequate, though somewhat loose). And it would mean a further serious set-back to our prestige throughout the East.

Surely, if we wish to avoid these disasters, we must manage to remove the danger of attack. We have seen that the chief external danger, probably the only one, is from Turkey. Therefore our main purpose must be to make friends with the Turks. I am here treading on very difficult ground, as there is undoubtedly a very large body of opinion in England hostile to Turkey. We have heard, for many years, such remarks as "the terrible Turk," the "damned assassin," and so on. I think, however, that a great many people of anti-Turk feeling forget that they are speaking of Orientals, who cannot be treated in the same way as Europeans. The Turk undoubtedly has committed many atrocious massacres of the Christian minorities, but it is also a fact that those same Christians, where, occasionally, they have found themselves locally in the majority, have committed equally atrocious massacres of the Turks. It must be remembered that in the hinterland of Asiatic Turkey there is little, if any, distinction between the peoples of the various creeds. They talk the same language, they sit in the same coffee shops, and the truth is that they are all tarred with the same brush. The reason for the Turkish hatred of the Armenian is really that the Armenian is very much too clever for the Turk, and that on the rare occasions when the Turk manages to collect any money it almost invariably finds its way rapidly into the pockets of the Armenian. My own knowledge of them both convinces me that, if we leave out of account the religious argument, an excess of sympathy towards the Armenian as against the Turk is unjustifiable, and in saying this I am confident that those of you who may also have knowledge of them both will support me.

Before closing I wish to reiterate that I have been dealing solely with the military aspect of these problems. The political aspect I am neither willing nor competent to discuss. The countries for which we have accepted Mandates have undoubtedly a great future commercially if allowed a period of peace in which to develop. There are many anxious problems to be solved, and very great difficulties to be overcome. It is our part, as soldiers, to grapple with the military portion of the problems, and, having formulated a sound military policy, to recommend its adoption to those whose business it is to shape the destinies of the Empire. I have tried to show what our policy should be from the military standpoint, and there are certain indications that our national policy is being shaped

along these lines. Let us make friends with Turkey, thereby creating a period of peace in the Middle East, and there is then a fair prospect that as a reward for the blood and treasure which we have expended in these territories we may at last find in them the "land of promise flowing with milk and honey."

DISCUSSION.

THE CHAIRMAN: Ladies and Gentlemen, I think I will break the Rules of the Institution by opening the discussion myself, because from the aviation point of view I have something to add to what Colonel Barron has said which may lead to further discussion on the part of the audience. The Lecturer has explained to us that Iraq is really useless from the purely military point of view—in fact that it constitutes a danger and a weakness. I quite agree with him; but from the communication point of view it *does* mean something at present. I believe I am right in saying that past history proves that all great Empires have managed to keep running so long as the communications between their various dominions were efficient and rapid, and that when those communications broke down the Empire started to break up. Our Mandates in Palestine and in Iraq give us facilities for the operation of a British air route on more or less Red soil between Cairo and India. Actually to-day a fortnightly service is operating from Cairo to Baghdad. It starts at Cairo, works up the coast line of Palestine, then across the Judaean hills north of Jerusalem to a place called Amman on the Hedjaz Railway, where a halt is made for the first night. You do 330 miles the first day. On the second day you jump straight across the more or less waterless desert to Baghdad, a trip of about 550 miles. Thus, the mails are carried from Cairo to Baghdad in two days, instead of taking three weeks as they would do if they went all the way round Arabia and were landed at Basra. It is an interesting trip, particularly at Amman. Amman itself must have been quite a big Roman settlement in the old days. The remains of the old Roman citadel exist on the top of the hills, and there is a Roman amphitheatre, which must have seated 3,000 people, cut out of the hill side. This country, in which there is the only water in this part of Arabia, is also full of ruins and must at one time have had a very large population. Amman is the old town that was called Philadelphia in the time of the Greeks. Further east is a place called Kasr Asrak, where there is a great deal of water and more Roman ruins. This is a very interesting piece of country. Here there is a big strip of lava which must be the relics of the old Sodom and Gomorrah eruption which we read of in the Bible and which had to do with the forming of the Dead Sea. This area also must have been inhabited at one time because there are a great many inscriptions on these lava rocks and many signs of very old habitations which no one has yet been able to explain. After leaving the lava country you get into the desert proper. It is not one's conception of "desert" exactly because there is practically no sand there. It is all rather hard clay soil, rather of the type that is called "putt" in India, mixed up with stones and a certain amount of rocks, and there are a good many low hills and a lot of watercourses. During the hot weather it is absolutely waterless, but during the winter, some time in December and after, there is usually heavy rain and there is a good deal of surface water lying about. When I crossed you could see water in every direction, and there were a large number of Bedouins grazing their camels. That air route has been started, and the next step to India is to link up Baghdad

with Basra and so on to India. The Baghdad-Basra route is perfectly easy and as a matter of fact is running now; machines are running up and down every day. From Basra to Karachi is about 1,400 miles, and there is no very serious difficulty about the route. Three or four machines have already flown over the course, and it is only a matter of spending a little money in order to create a good organisation. I do not think there will be any difficulty at all in running through from Basra to Karachi in two days pretty regularly. The Lecturer has referred to the question of our relations with Persia. Instead of Persia being, as it used to be, our great friend, it is now very much Anti-British. When I was talking to Sir Percy Cox in Iraq he seemed to think the Persian situation was so difficult that, when we do start the air route to India, it might be advisable to stick to Arabian soil so long as we can and jump straight thence on to Baluchistan. The route which is running now from Cairo to Baghdad, with a view to getting on to India, as it is quite easy for anyone to see, is not, strictly speaking, the best commercial route. It has certain drawbacks. To begin with, it is not a straight line; it has to cross the Mediterranean and 550 miles of desert, both of which entail the carrying of a great deal of fuel, so that the useful load of the machine is lowered. It also makes salvage very difficult, insurance high and regular running rather difficult. Of course the direct route from London to Delhi would be down through Europe to Constantinople, then along the old German railway and so on, because on that line you are passing productive country, or at any rate potentially productive country, the whole way, and you would be practically following a railway all the time. The Lecturer has described the possibility of building a railway across here. I found in Iraq, as he has indicated, that the general feeling was against developing the old German railway, and in favour of trying to create a more or less all Red route. At the present moment I do not quite know where the money is coming from to make this railway. We know that the old German railway is more or less complete, though I do not think anyone knows how far it is running in Turkish territory; and I believe that the question of the ownership of the bit of railway up to Constantinople is a very complicated one. I think, however, that if it was thought worth while by Government, British interests could get control of it so that there might be a practically British railway running right through from Constantinople to Basra. I mention that because, contrary to general opinion, aviation at present will always follow railways if it can. If this other railway is built it at once makes the Cairo to Baghdad route a very much easier proposition, because you can come down perhaps once or twice when flying across the desert and fill up with petrol and thus save a great deal of money, and you would also be able to salve the machine if you had a forced landing. I hope we shall have a good discussion on this most interesting paper.

MAJOR R. EVANS (Royal Horse Guards): Mr. Chairman, Ladies and Gentlemen, there is one point I venture to add to the remarks made by Colonel Barron on the subject of railway projects, namely, that there was at one time a suggestion that the Baghdad railway should be linked up with the old German railway *via* Kifri, Kirkuk, Erbil and Mosul, instead of by the Tigris route through Shergat to Mosul. Both military and commercial reasons were put forward in support of the project. The military reason was that railway communications in this direction would give strategical access to the frontier towards Kurdistan. At that particular time the Kurdish tribes were proving themselves rather difficult and it was feared that a new "North-West Frontier problem" might present itself, and it was thought that a railway bordering on the Kurdistan territory would be of military value. Commercially, of course, the line would have distinct advantages, because it would

link up the productive districts of Southern Kurdistan with Baghdad; whereas by the Tigris route no productive area was touched and you went through practically a desert the whole way. I bring those facts to the notice of the Lecturer because they refer to a rather interesting variation of the project of linking up Mosul and Baghdad by the old route surveyed by the Germans.

SIR MICHAEL O'DWYER, K.C.S.I.: Mr. Chairman, Ladies and Gentlemen, it is rather presumptuous for me to join in a discussion which is entirely a military one, but in the East, military and political matters are so closely allied that perhaps I may be excused for doing so. My reason is that I spent most of my service on the North-West Frontier of India and the Punjab, and I happened to be Lieut.-Governor of the Punjab during the war. At that time we were continually expecting either political trouble or military trouble from the very direction (Iraq) which the Lecturer has described to us this afternoon. I want to dwell on this point because in matters of this kind our policy should not be entirely guided by purely military considerations. I think no one can but agree with what the Lecturer has said, that our hold on Iraq is not necessary from the point of view of our military position in India. But let us look at the matter from the Indian standpoint. Between 1914 and 1919 we, in Northern India, were continually expecting trouble from that quarter. During the first two years of the war the Turks were in possession of Iraq, and during those two years we were being kept in a continual ferment. German and Turkish missions and spies were passing through Baghdad and Persia on to Afghanistan, and also trying to enter into India by the southern route through Baluchistan. Their object was primarily propaganda, to be followed by invading armies of Turks and possibly Germans. Some of them arrived at Kabul in 1915, and they endeavoured to dominate Afghan policy. They joined hands with the revolutionary party in India, whose emissaries were in Kabul, and they very nearly brought about a serious Mahommedan upheaval in India. Fortunately we were able to intercept the scheme before it materialised. That was in the first two years of the war, while Iraq was still in the hands of the Turks and they could, and did, make use of Iraq to pass through Persia into Afghanistan, or through Baluchistan into Sinde and the southern Punjab. Then an extraordinary change took place. In March, 1917, we occupied Baghdad. I remember well going down to my Council in the Punjab that morning. The Council was composed largely of Mohammedans, and there was an extraordinary enthusiasm among them over this great military success. They said, "We have now blocked the route of the Turks and the Germans, and the Frontier of India is secure." As we pushed forward north towards Mosul and later through Persia up to the Caspian we did find that the frontiers of India were absolutely safeguarded, and that the bands of conspirators which had been entering Kabul and trying to force their way down into India found their way barred, and we had peace from that direction. As you probably know, we had to carry on a great recruiting campaign in the Punjab to obtain men for Mesopotamia, and we had to obtain the men very largely from the Mohammedans in the north Punjab. I think we enlisted 180,000 Punjab Mohammedans, mainly to fight the Turks in Mesopotamia and Palestine. I attended many of the meetings, and in our appeals for recruits to go to Mesopotamia to fight the Turks and the Germans, we said: "You are thereby guarding your hearths and homes in India." That shows that from the Indian point of view the occupation of Iraq was, in the first instance, regarded as a safeguard, and the possession of it was looked upon as a bulwark. Therefore, in addition to the three very cogent reasons which the Lecturer gave us for not withdrawing at this stage from Iraq there is a fourth, *viz.*, that the Indians, and

especially the martial classes of Northern India, regard our presence in Iraq as a safeguard and a bulwark to India. From a purely military point of view it may be worth very little. But from the political point of view, the outlook of the people whose hearths and homes we have to defend and the troubles that may be facing us, our hold on Iraq is a very important consideration. There is one other point to which I would like to allude. The Lecturer said there are three possible external sources from which trouble may be expected in India—the Bolsheviks, the Turks, and the Afghans. The Afghans, he rightly pointed out, are contiguous to us and have only to attack our border as they did in 1919, and try and force their way in; they are not much concerned with Mesopotamia. But for the Afghan, the mere fact of having an enemy in his rear, even as far off as Mesopotamia, is an important consideration. I do not say our presence in Mesopotamia would prevent the Afghans from attacking India, but still the fact that there is a British force in Iraq which might be thrown across Persia is a fact which would count. With regard to the Bolsheviks, as the Lecturer said, their natural line of advance would be down the Russian railways into Afghanistan. Finally, with regard to the Turks, as the Lecturer said, if they wish to fight us they would naturally attack our weakest points, *i.e.*, Iraq and Palestine, and the Lecturer used the very significant words that, if they did attack us, our best course would be at once to withdraw. It is not for me to criticise military strategy, but I would like to advance this consideration. All through the war the Turks were attacking us in Mesopotamia. The Turks at that time had the Germans, the Austrians and the Bulgarians on their side, and yet, in the face of their attacks, we succeeded in holding on, in fact not only in holding on but in pushing our way from Basra to Mosul. If we succeeded in doing this against the united forces of the Turks, the Germans, the Austrians, the Bulgarians and others, surely, if we were attacked by the Turks only, the question arises: why should we be compelled to withdraw from Mesopotamia? I am not venturing to give any military opinion on this matter, but I do say that if, at the first sign of attack, we were to withdraw from Mesopotamia, the result on the 70,000,000 Mohammedans would be highly dangerous. They would say: "We have pulled down the flag;" and in the East if you pull down the flag your prestige has gone, and when that has gone, everything has gone. There is one other matter to which I should like to refer. Apart from an attack by the Turks, which I admit is a thing to be avoided if possible by coming to a reasonable understanding with them, there is another menace, and, I think, the greatest menace of all—the fact that all the Mohammedan forces of Western Asia might combine against us. That is no mere fancy picture. We know that for years that has been the policy of the Bolsheviks. We know that the Bolsheviks have not only made treaties which are hostile to us with Afghanistan, with Angora, with Persia, and the Mohammedan Republics of the Caucasus; but we know that the Bolsheviks have arranged treaties between those very Powers themselves. Could there be anything more significant than the fact that this last year the treaty, some clauses of which were undoubtedly aimed at us, between the Angora Turks and Afghanistan was signed—where? In Moscow! To my mind—but of course it is for people more competent than I am to judge on this matter—the object of the Bolsheviks in all this has been to engineer a general movement of the Mohammedan powers and peoples in Western Asia against the British in India. The British Empire in India they look upon as the most vulnerable point of attack, and therefore we have to consider our position in Mesopotamia not only with reference to an attack by any of these Powers singly, but by the united forces of all combined. It is a question whether, in the face of such a combination, we should endeavour to hold on to our military position in Mesopotamia as we did

during the great war, or whether it would be wiser to cut our losses there and retire to our base in India. I only mention that as a matter for consideration. We have to consider primarily not only the purely military point of view, but the effect of the action we may take from military or political or combined considerations in Mesopotamia—how it will affect our prestige in the East, and particularly among the Mohammedans of Northern India. There is one very significant fact I should like to mention before sitting down. I was in Lahore a fortnight after the Armistice was signed, and a leading Mohammedan in the Punjab, a man with very large interests in Mesopotamia, who had done excellent work for us in the way of recruiting among his people in Northern India, came to see me. He was full of congratulations. He said to me: "Sahib, the world is at your feet; the British Empire is supreme everywhere. You have broken the Kaiser; you have broken the Turk; you are dominating Asia, Europe, the world." He was full of good wishes as to the future; he saw no cloud on the horizon. An hour afterwards a Hindu gentleman came to see me who was in close touch with Gandhi and the Hindu Extremists. He also began his congratulations. When I asked him: "How do you think it will affect the Indian situation?" He said: "A friend of mine has just told me that Mr. Gandhi says 'the British now think they are supreme, that they are the masters of the world, that they have the world at their feet,'" repeating almost the same words that had been used by my Mohammedan friend. "But," he said, "Mr. Gandhi went on to say, 'I have got a card up my sleeve (or words to that effect) with which I will bring the British to their knees.'" That was a fortnight after the Armistice, and it was at this time that he was working out his policy of non-co-operation. I did not think very much of it at the time. But it is very significant to see now that in pursuance of his scheme, to drive us out of India, Mr. Gandhi's first move was to join with the revolutionary Mohammedans of Northern India and to enlist them on his side by posing as the champion of the Turks. It shows that the menace from the Bolsheviks outside India in engineering a combination against us is also appearing in India by the combination of the Hindu revolutionaries and Khalifat propagandists in India who have been brought together for the time being under the banner of Mr. Gandhi. It is significant that one of the main planks in their programme is to seduce the Indian troops from their allegiance, and to persuade the Mohammedans that to serve in Mesopotamia or Palestine is a crime against Islam.

COLONEL A. C. YATE: Mr. Chairman, Ladies and Gentlemen, The question of the railways between the country which has been the subject of this lecture and India is not a new one. It dates back many years. If we go back to the Chesney period, it covers about 80 years. It struck me, when the Lecturer laid down certain possible lines of railway as likely to be carried out at the present time, that similar schemes have been going on for 80 years, and none of them have matured. All kinds of schemes have been put forward, and one wonders at this moment whether those which have been suggested to-day will also fail to mature. When Chesney started his scheme, other greater schemers outlined railways starting from Calais and finishing up at Calcutta or Canton.* One such scheme, put forward in 1842–5, was named "The Atlas Railway." As the Honorary Secretary of the Central Asian Society I also am called upon to organise lectures. In this room about two months ago Mr. Grove, who is the latest authority on Persian railways, gave that Society an outline of his ideas. It fell to my lot in 1911 to lay before the same Society a scheme for the Trans-Persian railway. Most of

* *Vide* Andrew's "Euphrates Valley Route to India," p. 6.

us here will remember, I think, that the Russians were then extremely keen on the subject, and the British and Indian Governments showed willingness to co-operate on certain conditions. France also began to take an interest in the matter. Promises of British and French capital were obtained to a considerable extent, but the war brought the schemes to a close. That railway was to branch off from the line from Batum to Baku, about 50 miles east of Baku, pass round the south-western corner of the Caspian Sea, and then push on by Kasvin, Tehran, and Yezd, to Kerman. Beyond that, when war broke out in 1914, no definite line had been settled. The strategical aspects of that railway as affecting India had to be taken into consideration, and they aroused serious concern. A break of gauge was one thing that was insisted on. What has become of that railway? There is no sign of it at the present moment: it is a dead letter. Alone the War produced the extension from Nushki to Duzdab in Persia. Looking up the subject at the time of Mr. Grove's lecture, I found that the Central Asian Society alone had received, between 1904 and 1919, eight lectures about it. Our military attaché at St. Petersburg, Colonel Beresford, our military attaché at Tehran, Colonel Picot, the late Mr. H. F. B. Lynch, M.P., myself, M. Chéradame, and Colonel Webb Ware all lectured on it to the Central Asian Society. A different line altogether was suggested by Mr. Drummond Black, which, as far as I remember, followed more closely what the Lecturer to-day defined as his southern route. It started from somewhere near Port Said and it finished up at Basra or Koweit. Anyhow, I was present in this very room when Mr. Drummond Black laid his scheme before this Institution. It occurred to me, while listening to the lecture which we have just heard, to remind the audience that a great many schemes in reference to railways in the Middle East have been put forward, and that most of them have resulted in nothing being done. There is another point I should like to mention. It is a rather curious coincidence that the Central Asian Society will meet here to-morrow to listen to Air-Commodore Brooke-Popham give an account of the very important air route from Cairo to Baghdad, to which the Lecturer has referred. I was interested to learn from the Press recently, that two ostrich eggs reached the Zoo by that route in ten days, and I am told that the late Acting High Commissioner of Mesopotamia, Sir Arnold Wilson, will reach London next Saturday by the same route.

Lieut.-Colonel F. W. Barron (in reply): I do not think I have anything to say with reference to Major Evans's remarks about the Kirkuk railway. I purposely did not mention it because, for one thing, by the time I got on to the subject of railways I knew my time was running short, and, for another thing, it did not really affect the argument of the lecture. Major Evans was perfectly right in everything he said, with one exception. I do not want to quarrel with him over it, but I think he is wrong in one thing. The military reason why that railway was projected was, I think, not in order to run along the foothills of Kurdistan, but in order to get on that side of the Tigris. The danger was looked on as coming from the north-west, and the railway to Mosul lies on the west bank of the Tigris. The idea was that the alternative route would not only tap the very rich commercial districts of Kirkuk, but it would also interpose the Tigris between the railway and any possible attack. I daresay the idea of the approach to Kurdistan may have come in, but, if so, I did not know about it, and as I was concerned in the proposals for the siting of the railway I think I can claim to know something about it. As regards what Sir Michael O'Dwyer said, of course I am not for a moment going to put myself up in opposition to the real authority which we all know him to be, but I am rather afraid from what he said that I cannot

have made my argument quite clear. I gather that Sir Michael O'Dwyer considers that one of the objections to withdrawing from our present position in Iraq is that it would enable Turkish emissaries to arrive on the frontier of India with greater ease than is the case at present. In proof of that he quoted what happened in the first two years of the war. I think he must have missed my point. My whole point is that we do not *want* to retire in Iraq. I gave three reasons why we remain there, and I said there was no purely *military* reason why we should not retire, but at the same time I said that, if we did, we should lose further prestige in the East. In that I think we may include the points that Sir Michael O'Dwyer has drawn attention to. Then, again, Sir Michael O'Dwyer was inclined to cavil at my saying that if we were attacked by the Turks in Iraq we should have to retire. Again I think Sir Michael O'Dwyer has not quite appreciated the *context* of my remarks. I said that if we were attacked in Iraq or in Palestine, *as a part of an attack on India by Islam*, we should have to retire. My point is that if our position in India is attacked by Islam it means a very, very serious situation, because the Mohammedans in India and the Mohammedans all around India would be attacking us, and we should want every single soldier that we possess in the British Empire—and incidentally thousands more than we now possess—and we could not afford to lock up a single one of those soldiers in any country in which we have only a very problematical financial interest and no military interest whatever. That was my argument why we should have to retire if we are attacked in Iraq, *as part of a general attack on India by Islam*. As regards Colonel Yate's remarks about railways, of course we know that there have been, as he said, during the last 80 years dozens of schemes prepared for railways. I did not propose in my remarks to touch on the railway problems of the East and the Middle East as a whole; I rather wanted just to mention as it were the more recent projects. The more recent projects have been those of General de Candolle. I think it was in 1918 he came out to Iraq, and his projects included the Euphrates Valley Railway, the completion of the old German railway, and the railway through the centre of Persia and along the coast. Colonel Yate has told us about the old project for a railway through Persia which was to start somewhere up in the Caucasus and come down through Tabriz, Tehran and Yezd into India. A section of that railway, between a spot just south-west of Tehran and India, is included in General de Candolle's project for the trans-Persian Railway. The only difference in the two projects is the route by which that spot is arrived at. In General de Candolle's project you arrive at it by going up through Baghdad and Kirmanshah, and you leave this gap between Tabriz and Tehran unfilled. I think I may say that, in the present temper of Bolshevist Russia, we should be extremely unwise to fill up that gap.

THE CHAIRMAN: Ladies and Gentlemen, The Lecturer has put before us one of the most interesting problems which the British Empire has to face in the future. He has shown us that, from the purely military point of view, Iraq is really of not much good. To me it has two points of interest at the present moment, one of which I mentioned in my previous remarks. The second, which I did not touch upon, is the fact that it has given Mr. Winston Churchill a chance of giving the Air Force the opportunity of proving what they can do as an independent Force. It is a vastly interesting experiment, and our mandate in Iraq, where the army did not want to stop very much, has given us an opportunity to try it. As I said at the beginning of my previous remarks, Iraq also provides us with a jumping off place for aerial transport between London and Delhi, which I look upon as a very important undertaking in the future. Within six years, if we sit down

to it now, I think we shall be able to fly to Delhi from London with passengers, who will sleep on the way, in seven days, and we should be able to get the mails through in 72 hours; and that will make a very big difference in our communications with India. Sir Michael O'Dwyer rather apologised for butting into what was a military problem, but this is far more than a military problem. It is a very big political and commercial problem, and it is an extremely good example of the difficulty of government. We have heard the Lecturer say that it would be criminal folly to reinforce Iraq in case of war with Turkey or the Bolsheviks. I quite agree with him on purely strategical grounds, but I remember hearing almost the same words said ten years ago. And yet during the late war there was a time when it seemed to the onlooker that our greatest desire was to send troops everywhere, and often anywhere, so long as they were not opposed to the Germans. As a nation, we are past-masters in making detachments in war and I am afraid we always will be. In spite of all the strategy we lay down during peace time, the moment the bell rings we shall have our troops all over the world. Sure as Fate! There is another point which has not been referred to upon which I should like to make a remark, and that is the question of our commercial commitments. That is where the General Staff have got to watch things in Iraq. At present, as the Lecturer explained, we should be perfectly happy from the military point of view if we held the line shown on the map, because at present the Anglo-Persian Oil Company are working these wells, they have certain pipe lines, and they are pumping out oil which is taken away by ships. But they also own a great many of the concessions in *this* area, and the general opinion is that there are some very valuable oil-bearing fields all round this place on the map, north and east of Baghdad. The definite Anglo-Persian policy, when they start working that oil, is to carry it by pipe-line to the Mediterranean. It is too expensive to bring it through the Persian Gulf round Arabia, through the Red Sea and the Suez Canal, where they have to pay Canal fees and all the rest of it. It will pay them to spend two or three millions to run a pipe line through to the Mediterranean. Therefore you have to change the whole of your strategy, because if they do that you must remember that it will be one of our most important sources of supply of oil for the Navy, the Mercantile Marine and the Air Force. So that we shall have to take some steps in the future to protect these fields and the pipe line connected with the Sea. The General Staff have some very pretty problems in front of them there. First of all there is the question of where they are going to encourage the Anglo-Persian people to put their pipe line. Are they going to encourage the completion of this German railway? I think it will come inevitably for commercial reasons; the Germans now claim that they had very heavy profits indeed on this part of the Anatolian railway. Or will they back this other railway to Haifa and have the pipe line in that direction? There is also another nice little problem to be considered: are we going to back the present policy, which has not been really definitely formulated, but which I can say exists amongst the officials in Iraq, the policy of creating an Arab Empire embracing the Hedjaz, Trans-Jordania, Iraq, and the various other Independent Arab Sheikhs lying along the Persian Gulf? Finally, I heartily agree with what the Lecturer said about the Turks, in fact Sir Percy Cox's last words to me when I left Baghdad about Christmas were: "We must have peace with Turkey," and until we get that Iraq cannot be said to be safe, nor will it develop into settled peaceful conditions.

Ladies and Gentlemen, I am sure you will all join with me in thanking Colonel Barron very much indeed for his excellent lecture and in congratulating

him on the very lucid way in which he has described our position to-day in the Middle East.

The Resolution of thanks was carried by acclamation.

GENERAL SIR NEVILLE LYTTELTON: Ladies and Gentlemen, It affords me much pleasure to move a vote of thanks to Sir William Brancker for taking the Chair on this occasion and also for the very interesting remarks from an aviation point of view with which he supplemented the lecture.

The resolution was carried by acclamation, and the Chairman having briefly acknowledged the compliment, the meeting terminated.

THE INFLUENCE IN THE FUTURE OF AIRCRAFT UPON PROBLEMS OF IMPERIAL DEFENCE.

By FLIGHT-LIEUT. C. J. MACKAY, M.C., D.F.C., Royal Air Force.

GOLD MEDAL (ROYAL AIR FORCE) PRIZE ESSAY FOR 1921.

Awarded Gold Medal and first Trench-Gascoigne Prize of Thirty Guineas.

Ponder the path of thy feet, and let all thy ways be established.
Proverbs 4, 26.

CHAPTER I.

INTERNATIONAL DISARMAMENT.

Peace is at best but a truce on the battlefield of time.
Clausewitz.

1.—*A Lesson of History.*

FREDERICK THE GREAT, a shrewd judge of human nature and a master of war, in one of his letters to Voltaire, writes: "Running over the pages of history, I see that ten years never pass without a war. This intermittent fever may have moments of respite, but cease, never."

Do the existing world conditions lend colour to the view that war can be made impossible? Admittedly a large part of the world is war weary and would welcome perpetual peace, but it is a long step from the wish to the accomplished fact. Plato's Republic, the model state, which was based on human nature, recognised the impossibility of entirely preventing war.

The teeming millions of China and Japan must find an outlet for their surplus population; are they likely to submit a claim for territory to the League of Nations? Though there is certain justice in their claim, can the League of Nations allot them a slice of Australia or California, thus settling their claim peacefully and proving that Plato's Republic is based on a misconception?

It must not be supposed that the principle of arbitration is being impugned, because the principle in itself is most worthy, but, though arbitration may settle minor cases and save minor wars, it cannot settle the type of case which is liable to involve a big Power in a big war. In

scores of lesser quarrels resource has been had to arbitration, and its awards have been accepted without the loss of one jot of national prestige. But all this notwithstanding, in a last analysis, as Bacon long ago pointed out, the ability of a State to use force, the power to right wrongs and uphold claims if necessary by the sword is not less essentially a condition for the greatness of kingdoms and estates than are the purely municipal and economic qualifications. Is it possible to believe that of the present three great naval Powers most concerned in disarmament—

(*a*) The United States would have submitted to arbitration the question of Cuba?
(*b*) Japan, the question of Korea?
(*c*) Or England, the question of South Africa?

Is there any reason to believe that the national court of the twentieth century will be any more successful than its predecessor of the nineteenth, the unfortunate Concert of Europe, which came to an untimely end in 1823.

2.—*The present Situation.*

The Peace Conference has transformed Europe into a seething mass of mutually hostile States, powerless to face the economic competition of their rivals,[1] and continually at variance with their neighbours. Add to this the Pacific situation and it may be seen that the League of Nations is in the unhappy position of a small boy put in a cage of hungry lions to teach them how to eat politely.

For the present, at any rate, Great Britain would be well advised to avoid war by preparing for war, and to turn a deaf ear to the plea that the armaments maintained by other nations are purely for defence, for such a plea necessarily implies other nations have some interest in attack.

It is doubtful if von der Goltz was far wrong when he summed up the situation.—

"The mutual mistrust between nations ever makes all proposals of disarmament exceedingly suspicious. The first was made in the winter of 1800-1801 by Bonaparte, then First Consul, to the Ambassadors of Austria and Prussia. 'The Court of Vienna certainly desires nothing better, but the difficulty consists in persuading the Court of Berlin to accede to it,' was the shrewd Austrian reply. Upon this same standpoint the matter will ever rest. Each Power is bound to demand that the other take the initiative, and, owing to the apprehensions entertained of others, none will be willing to take it."[2]

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[1] "The Peace Conference," Dr. E. Dillon.
[2] "The Nation in Arms," von der Goltz.

CHAPTER II.

FINANCE.

There are three things necessary for war—Gold, Gold, Gold.
Montecucculi.

3.—*Present Financial Position.*

It is a fatal and foolish act of political weakness to disregard the military and strategical standpoint, and to make the bulk of preparation for war depend on the financial means momentarily available, and yet it would be difficult to attempt any discussion on armament, whether air, land or sea, without taking into account the all-important condition of the national purse. Before the late war the total naval and military expenditure of the British Empire represented only a national insurance of 3 per cent. on income and 0·4 per cent. on wealth. What would be the verdict of the world on a firm which adopted a similar policy of insurance? Yet the same people, who would be the first to decry the stupidity of such a short-sighted policy, are one and the same as those who impede national insurance on business lines.

Without necessarily resorting to a Bismarckian war chest, a nation must make regular and adequate provision year by year for its own protection, so that when the day of battle arrives it will not be compelled to spend tenfold by reason of the parsimony of the past. Twice in two decades has Great Britain learned this lesson—in the South African and in the late war. If, a few months before the outbreak of the South African war, the War Office had had the sum of £10,000,000 at its disposal, which would have enabled it to spend without publicity, preparations could have been made which would have reduced the cost of the war by not less than £100,000,000, namely, to £111,560,000.[1]

In the late war this country was compelled to spend in a year a sum which staggers the imagination, chiefly because the money for offensive protection in a European war had not been forthcoming from previous generations—a heritage to the cost of which the financial state of the nation now bears witness.

Immediately following the outbreak of war in 1914, the press and the public initiated a vigorous campaign of abuse directed at everyone remotely concerned in our preparation for war, it being alleged that national defence had been starved. Military defence had been starved: but it was starved by reason of the parsimonious attitude of the public and press before the war, and that, too, in spite of the warnings of many eminent soldiers, whose very profession qualified them as competent judges. And now that another danger mark has been passed, the press and the public are busy endeavouring to ensure that a similar unenviable heritage shall be passed to succeeding generations. The public refuses to realise that an oak which has attained so vast a growth as the British Empire must always arouse some anxiety when storms and gales set

[1] "Report of Lord Elgin's Commission on the S.A. War."

in. " It is certain that we shall never be without tremors, if not panics, while we are content to sit beneath the spreading branches and trust that it will survive for the future just because it has weathered many tempests in the past."[1]

4.—*Application of Finance to Armaments.*

It is the duty of every citizen of a State to defend that State with his time, his money, and his life, but in times of peace he is only required to produce the money with which the defensive organisation of the State is built up. The application of that money to the provision of defensive armament is a responsibility vested by the public in the Government; it is the duty of the Government to apply the money in the most economical manner to the various forces of defence according to their value. It is for the Government to decide, after hearing the advice of its specialists, on which force the main burden of defence falls, and to apply the larger portion of the defence vote to that force. In France, Germany, and other continental Powers, the chief protective force has been the Army; in England it has been the Navy, though since the armistice a larger proportion has been devoted to the Army. The cause of this change may be summed up briefly as follows :—

(*a*) World unrest, chiefly in the East, with which ships cannot deal.
(*b*) Increased Colonial commitments.
(*c*) Impossibility of competing in a naval armament race with more wealthy Powers.
(*d*) Elimination of the naval menace, which was our immediate concern since 1905.

Unfortunately it has not been possible to decrease naval expenditure in proportion to the increase in military expenditure. The Navy must be maintained at a minimum of a one-power standard.

Can the taxpayer's burden be reduced by the introduction of some cheaper method of garrison in those countries which are eating up our military resources? We cannot clear ourselves of the matter by jettisoning those commitments which are proving financially inconvenient. It is one of the burdens of Empire, especially an Empire which embraces large Eastern possessions, that, for the sake of prestige, an undertaking once begun cannot be abandoned. It is on the shoulders of British prestige that the Eastern portions of the Empire rest—weaken that prestige and the Empire might totter to its fall; indeed, it has already been shaken sufficiently through the agency of the Dardanelles campaign and the fall of Kut.

It is suggested for consideration that the only method by which we can cope with our responsibilities and, at the same time achieve economy, is by a more extensive employment of aircraft and a corresponding reduction in other methods of garrison.

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[1] " Imperial Defence " Colonel E. S. May.

CHAPTER III.

Influence of Aircaft on War.

Although the leading principles of warfare are said to be eternal, yet the phenomena which have to be dealt and reckoned with are liable to continuous change. *von der Goltz.*

5.—*Vulnerability of New Weapons.*

It is not intended to claim for aircraft that its introduction as a medium of war will alter the leading principles of warfare or revolutionise the methods of conducting it, but rather to show that the advent of aircraft subjects war to the same changes to which normal human intercourse is liable by reason of the discoveries of science. The leading principles of war are unchangeable, but their application is affected by the introduction of new weapons, whether these be bell-mouthed blunderbusses or tanks. Even the most conservative soldier will readily admit that the mechanical is gradually replacing the human element in modern war, and that aircraft, tanks and torpedoes are a part of this mechanical progress, which proves that every age has its own peculiar mode of warfare. There are schools of thought which maintain that tanks, aircraft, or gas will decide the next war, and that the infantry soldier as we have known him since the days of Monk is as obsolete as the bow and arrow. If such a contradiction would appear possible, it might be said that these theories are right and that they are wrong, but mostly wrong. They are right in so far as applied science is playing an ever-increasing part in war, and they are right in that a new weapon will confer an inestimable advantage on its possessor if it is not countered by a similar production on the other side. Thus King Harold would have won the Battle of Hastings if he had possessed some musquetoons, or Napoleon, Waterloo, if he had possessed a single machine gun. But where the prophets are wrong is that every new weapon or advance of science in war is counterbalanced by the production of either a similar class of weapon by other Powers or by a defence device which nullifies to a large degree the advantage that would otherwise be obtained. This may be illustrated by the following examples :—

Chassepôt.	Needle Gun and Prussian Field Gun.
Machine gun.	Artillery and Hand Bomb.
Torpedo.	Blister.
Tank.	Land Mine and Anti-tank Gun.
Gas.	Gas Masks.
Submarine.	Depth charge. Aircraft. "Q" Ships.
Aircraft.	Aircraft (A.A. Guns).

It will be noted that anti-aircraft guns are bracketed; the primary weapon with which aircraft must be fought is aircraft; too much emphasis

cannot be laid on this point. But a combination of the air offensive, local defence, anti-aircraft guns, balloon aprons, and sound locators, bring aircraft into the class of vulnerable weapons. Aircraft are therefore no more invulnerable than the submarine; they merely introduce us to war in a third element.

6.—*Progress of Service Aviation.*

Originally when aircraft showed themselves to be capable of sustained flight, they aroused the interest of the great Powers merely as a medium of reconnaissance. For this purpose Governments acquired and experimented with aircraft, and it was felt that Wellington's dream of seeing what was on the other side of the hill was realised. What was not realised was that, in order to see the other side of the hill, action must be fought by aircraft, just as Wellington's cavalry had to fight for the same purpose. Beyond reconnaissance, little scope for the employment of aircraft was anticipated.

The declaration of war in 1914 heralded a new era in Service aviation. Hitherto it had been the plaything of staffs; a source of excitement with which to relieve the dull monotony of autumn manœuvres. Within four days of the opening of hostilities a small bomb had been dropped in Liége by a German airman. In itself it did no damage, but its significance was undoubted. A few months later it was realised that information must be fought for in the air as in any other element, which led to the arming of machines, first with rifles, then with machine guns, and, subsequently, a special fighting policy became necessary. In due course, though all aircraft had to fight at times, fighting became a matter for specialisation, as had reconnaissance and all its subdivisions; aircraft design had to cater specially for each type of work. Lastly, aerial bombing became a specialised work, again subdivided into its different forms—long and short range, day and night. The real potentialities of bombing were only realised in the closing stages of the war; training in bombing, bombsights and bomb development had never received the attention they deserved until the formation of the Independent Air Force, nor did the German raids on London and Paris give any real idea of the power of the bomb. The fact that the importance of bombing was realised too late in the war to demonstrate its potentialities must be borne in mind when considering the claims put forward in subsequent chapters as to its power against industrial centres and military or naval objectives. Briefly this is the history of the growth of air power; what has been said in a military applies equally in a naval sense. Three years after the conclusion of hostilities, seven years after the air weapon had found its wings, we find it, not only as an essential auxiliary to naval and military operations, without which they cannot function, but, in addition, a primary arm with which an enemy may be threatened or subdued.

7.—Immediate Influence of Aircraft.

As the various influences of aircraft on war will be dealt with in detail as they arise in subsequent chapters, it is proposed only to summarise them here, so that the changes wrought may be seen collectively. These are—

(*a*) Ability to strike at an enemy's resources, industrial or otherwise.

(*b*) Ability to influence the ***morale*** of a nation by striking at the Government and the people themselves.

(*c*) Ability to influence the ***morale*** of an army by—

(i) striking at its homeland;
(ii) striking it when supposedly at rest.

(*d*) Extension of the area of war operations by reason of (*a*) and (*b*) above.

(*e*) Increase in the difficulty of attaining surprise.

(*f*) Increase in the difficulty of maintaining communications, whether by sea or land.

(*g*) Provides a fresh and untiring weapon of pursuit for the victorious commander.

(*h*) Ability to attack a superior land or sea force without tactical support.

(*i*) Deprives a stronger belligerent at sea of the power of cruising in force off the enemy's ports.

(*j*) Ability to blockade those enemy ports within radius of action of their base.

All the above, however, are dependent on the previous attainment of air supremacy. A commander, whether naval, military, or air, who cannot obtain aerial superiority for the force at his disposal would labour under so many disadvantages, that he might be regarded as having lost the campaign before it had developed. Some measure of air supremacy, that is, aerial superiority at the decisive point, is essential.

The disadvantages under which aircraft labour are—

(*a*) Cannot operate in bad weather; this is a disadvantage which affects all forces, though to a lesser degree.

(*b*) Cannot operate for any great length of time, nor at any great distance from its base. This disadvantage is being gradually eliminated, particularly since the cessation of hostilities.

CHAPTER IV.

PEACE STRATEGY.

War tries the strength of the military framework; it is in peace the framework itself is formed.—*Napier.*

8.—*Difficulties of Peace.*

Sound strategy in war is an art not easily mastered by its students, but the war strategy of a nation which has realised the necessity for its own protection possesses this advantage, the tools with which strategy is applied are in perfect working order and have the support of the whole nation, the master of the tools is himself in all probability a popular idol, and his difficulties are reduced to the minimum that a state of war permits. In the application of the forces with which his people have furnished him he is normally sure of success, provided that he is a leader of initiative and that he follows the rules of war. By this it is not for a moment intended to indicate that the application of the rules of war to the varying conditions in which a commander may find himself is a matter of simplicity; on the contrary, proper application of those rules to the conditions of the moment requires genius and life-long study. The matter is introduced so that a comparison may be drawn between the position of a commander in war, outlined above, and the unhappy lot of the head of a force in times of peace. Gone is the financial support, gone is cohesion of effort, gone is popular support; in their place is little else but general opposition. Yet it is the thankless task of a commander to apply himself to the preparation of his service for the next occasion on which the security of the nation may be threatened, for he is well aware that if the military preparation of a State is not based upon sound principles and directed to the achievement of definite objects, there are no grounds for any expectation that they will respond to the requirements of national defence.

Peace strategy bears the same relation to war strategy that the constructor who makes an aeroplane bears to the pilot who uses it. The constructor may do his work badly, or the pilot may be incapable of handling a perfect machine to the best advantage. If both do their work well there is a useful result, and not otherwise.

It is the business of peace strategy to ensure that the forces of the State are properly organised and distributed, and that their quality and numbers are adequate for the fulfilment of their mission in war. It is the duty of those responsible for peace strategy to consider—

(*a*) The situation of the State in war with each potential enemy in turn.

(*b*) The situation of the State in war with a combination of more than one of these potential enemies.

(*c*) The form of attack most likely to be adopted by each potential enemy.

(*d*) The form of defence[1] to meet that attack.

(*e*) The organisation of the force or forces which will comprise the defence.

(*f*) The definite standard of strength for each service.

(*g*) The distribution of force with due regard to their employment in peace and their concentration in war.

(*h*) The collective running of the machinery of the three Services for defence purposes as a whole.

9.—*Co-operation*

There are those who maintain that efficient co-operation between two Services is difficult, between three impossible.

" Nothing is impossible in war "; efficient co-operation in war merely demands that it be practised in peace. The trend of war is making the Services more and more interdependent, not indirectly as when " the storm-tossed ships on which the Grand Army had never looked "[2] had helped Wellington to his victories, but directly as in the naval operations off the Belgian coast in 1914 in support of the Allied left flank.

The Japanese operations against Port Arthur in 1904 are an excellent example of sound co-operation due to the fact that the efforts of the army and navy were co-ordinated by one head. In co-ordination of effort by a single staff under a single head lies the secret of intimate and successful co-operation. The expedition to Ostend, 1798, though it ended badly owing to weather, and the Kiao-Chao campaign, August–November, 1914, are other examples of successful co-operation.

The staffs of the Services in peace must be agreed as to the policy to be pursued in war; if they cannot voluntarily agree they must be compelled to do so, by the creation of a higher staff, with control over all three Services.

No better example is furnished of blank contradiction of policy and thought, even in peace, than by the views of the War Office and Admiralty as placed before the bewildered delegates to the Colonial Conference of 1902, when so vital a subject as " Dominion Contribution to Imperial Defence " was under discussion. The War Office representative asked for aid in forming an Imperial Reserve for fighting the Empire's battles " in view of the possibility of our losing command of the sea," while the Admiralty representative assured the oversea statesmen that " the British Empire owes its existence to the sea, and it can only continue to exist if all parts of it regard the sea as their material source of existence and strength."[3]

Is it any wonder that the conference was a failure, or that combined operations are impeded by opposite schools of thought?

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[1] " Defence " is used here in its broadest sense.

[2] " Influence of Sea Power on History," Admiral Mahan.

[3] " Imperial Defence and Closer Union." D'Egville.

At present there are in existence bodies to deal with—

Imperial Strategy	-	Committee of Imperial Defence (which has no executive powers),
Organisation	- -	W.O. Admiralty and Air Ministry,
Operations	- -	W.O. Admiralty and Air Ministry,

but no body to deal with the essential—Combined Operations. That portion of the Air Force which is allotted to the Army or Navy for essentially military or naval work is not included in the term "Combined Operations"; such allotments of the Air Force are under the tactical control of the military or naval commander concerned. There must, however, be some body to co-ordinate the efforts of the Army, Navy and Air Force in that class of operation which demands the joint effort of either two or all three Services, and again to co-ordinate the efforts of all three (even when they are not operating in combination) towards the one aim—the defeat and destruction of the enemy. There are some who believe that the Air Force has no rôle other than auxiliary to the Army and the Navy. To these it must be emphasised that the Air Force must protect the country from air attack and, where circumstances permit (bearing in mind that war can be prosecuted only by the will of a united people) "bring such pressure to bear upon the enemy people as to induce them to force their Government to sue for peace."[1]

This object is jointly achieved by the Services as follows :—

Army—defeating the enemy's land forces (assisted by aircraft).

Navy—retaining command of the sea by the destruction or containment of the naval forces of the enemy (also assisted by aircraft).

Air Force—obtaining command of the air by destroying enemy aircraft in the air and at their bases and carrying the war to the cities and industrial centres of the enemy country which the Army and Navy are unable to reach.

In some cases enemy national *morale* may be so lowered by the defeat of their air forces, and the consequent exposure of their resources and their homes to air attack, that their submission may be obtained by air action alone. Normally, however, offensive operations will be undertaken by all three Services, who must, to obtain decisive results, co-operate on the lines laid down in peace. If a spirit of misunderstanding and unhealthy rivalry prevails in peace time, its consequences will be felt in war. Adding the Air Force to the old Japanese proverb—the Army, the Navy and Air Force must move as three wheels of one vehicle. If they cannot do this on present lines, the question of a Ministry of Defence arises.

In fact, with the necessity for absolute co-ordination of effort as required from the armed forces and the civil population of a nation in modern war, it is a matter for consideration whether such a system should not be introduced at once.

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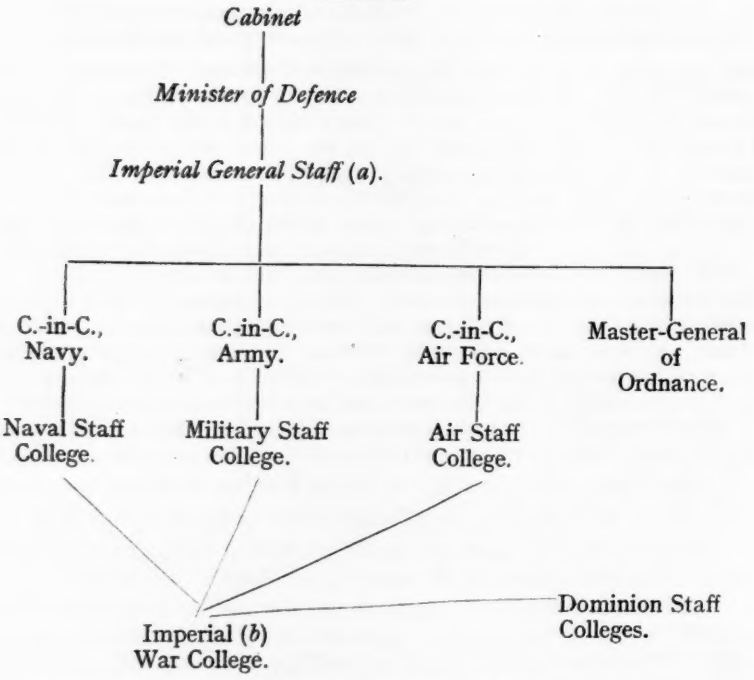
[1] "Field Service Regulations."

A suggested organisation for the Ministry of Defence is contained in Table A

TABLE A.



(*a*) The Chief of the Imperial General Staff to be a naval, military, or air officer selected by the Cabinet. The Imperial General Staff to be composed of selected graduates of the Imperial War College, and nominated by the chiefs of the various Services. The Dominions and India to be represented on this Staff.

(*b*) Distinguished graduates of the Service Staff Colleges to pass automatically to the Imperial War College. The same applies to graduates of the Dominion Staff Colleges.

The Imperial General Staff would remain the same in peace and war; it would co-ordinate and direct the general strategical naval, military, and air plans formulated in peace time. Having given the general plan, it would remain for the plan to be carried out by the commanders of each Service. Occasions might arise when the predominance of one arm in the operation might, in the opinion of the C.I.G.S. justify the appointment of a single commander for the whole operation. On such occasions the C.I.G.S. would appoint a single commander, and

would be in a position to ensure that the orders of the commander so appointed were loyally carried out.

Lord Haldane, a super-organiser, stated recently in the House of Lords that we did not need a Ministry of Defence to co-ordinate Army, Navy and Air Force, because the Staffs of the Army and Navy would always be brought up in a different way, and would always deal with problems of which the others were not even conscious." But that is just the point, there are no problems of which one Service should be unconscious. Imperial Defence is a pie which can only be prepared with the aid of the chef, the rolling pin, and the fire. If any fail to function the pie is a failure.

10.—*A Separate Air Force.*

It is not intended to discuss so vexed a question as that of a separate Air Force, though it is impossible to pass it over without at least a brief reference. Many people qualified to judge believe that air power is to be a big factor in war, and that the best use can only be made of air power when it is in the hands of those who, by making a study of its application, will understand its value and its limitations; those hands are the hands of the Air Staff.

Germany by the terms of the Peace Treaty is debarred from the possession of an Air Service, but military opinion in Germany is fully alive to the fact that in future the Air Service must have a separate entity. Bernhardi, in his latest book, writes: "A single command of the air forces is necessary under all circumstances."[1] England has placed herself in the front rank of air power by a policy of initiative which has been her birthright for centuries; why should she hesitate now in order to be shown the way by other Powers? As Sir Ian Hamilton expresses it: "If we are going to be so cautious, we may live to see the disinherited children of our brains marching against us in strange uniforms, commanded perhaps by those Asiatics who can copy and fight, though, thank God, they cannot invent."[2]

The American Aviation Commission, after investigating the Air Services of the principal European nations in 1919 recommended: "The concentration of the air activities of the United States, military, naval, and civilian, within the direction of a single Government agency created for the purpose, co-equal in importance with the Departments of War, Navy and Commerce."[3]

The opinion of M. Clemenceau may also be quoted with advantage: "I adhere entirely to the British proposition, which seems to me practical and effective, and I request you likewise to give it attention."[4]

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[1] "The War of the Future," von Bernhardi.
[2] "The Body and Soul of an Army," General Sir Ian Hamilton.
[3] "Report of American Aviation Mission," 19th July, 1919.
[4] "Letter to President of the Republic," 16th February, 1919.

CHAPTER V.

HOME DEFENCE.

The arm that will serve the enemy will be the arm that is the newest, the most sudden and the most terrible—the aeroplane.—*Marshal Foch.*

II.—*Air Attack.*

Great Britain is affected by the question of air power more closely than is any other country; air power merely exposes other countries to an additional form of attack, but Great Britain, hitherto immune by reason of her sea power, is exposed for the first time to any form of attack. Briefly, aviation deprives Great Britain of her insularity. Though the land frontiers of the Empire are enormous, a small army has defended them successfully for centuries. But the seat of this defence has been far away, and often such defence measures entirely escaped the attention of the public, who have consequently grown up to regard the local defence of these islands as the main duty of the British Navy, a duty so far very successfully performed. True, during the late war, some minor attacks by way of the air penetrated into the country, which caused the citizen some passing uneasiness, and resulted in his insistence on the withdrawal of certain air units from the battle front so that he might be adequately safeguarded.

Meantime the development of aircraft, of air navigation, and of the science of bombing since the armistice has given rise to a situation which supplies food for serious thought. The Empire is dependent on command of the sea for its security, yet the Navy is no longer capable of protecting the homeland itself from attack, because that attack can be delivered through an element over which the Navy has no control.

Great Britain's present position is analogous to the position in which Tyre found itself in ancient times. Tyre occupied a position in the Mediterranean out of all proportion to its size and population. The island, itself only a few miles long and situated less than half a mile from the coast, proved a stronghold of the most formidable nature. Its inhabitants realised the value of sea power and maintained a fleet which secured their independence through many centuries. Thus, in B.C. 598 and the succeeding years, they withstood the immense forces of Nebuchadnezzar's Assyrian army over two hundred thousand strong, and opposed him successfully throughout a siege which lasted no less than thirteen years. Ultimately, the city was besieged by Alexander in the year 332 B.C. and fell at the end of seven months. Alexander succeeded where others failed by depriving Tyre of its insularity. He built a mole across the channel which separated the fortress from the mainland, and brought his battering rams directly against the city walls.

Aircraft are the modern mole of Alexander; the aerial bomb is his battering ram. In truth it may be said that Italy, girdled against the Continent by her barrier of Alps, is now less accessible than Great Britain.

The air menace exists and must be provided for. Millions of pounds have been spent to safeguard the country in the past against invasion, and yet when it presents itself in a newer and closer form it is ignored.

Is it realised that France, untied by distant Colonial commitments, at the present time possesses forty-seven striking force squadrons to the three available in England?

Is it realised that even Belgium becomes a potential enemy in the matter of air power, and has available more squadrons for an offensive than we have at home for defence?

Is it realised that the present type of civil aircraft can be converted to bombing purposes in a single night, and that civil aircraft based on Germany can reach London with ease?

Do we feel certain that experiments with new and super-destructive bombs are not now proceeding in Germany, and do we appreciate that it is almost impossible to control German aeronautical progress, so that she cannot use the air as the bridge of revenge?

The country cannot realise these things, otherwise it would turn its attention to security at home, prior to vast armament precautions in the Far East. A man engaged in combat with an adversary will protect his head before his legs—Home Defence is the first postulate of Imperial Defence—and therefore this problem of an air attack directed at the vitals of the Empire is an issue which must be faced. While Hannibal threatened Rome in Italy there could be no idea of Roman Empire. London is the centre of the Empire; its loss, or rather, in the case of air attack, its destruction might be more paralysing than the loss of a great army.

It is true that Napoleon's seizure of Moscow in 1812, the British attack on Washington in 1812, or Admiral Duckworth's bombardment of Constantinople in 1807, failed to influence the policy of the nations of which these cities were the capital, but the circumstances are not analogous. The Russians were perfectly well aware that Napoleon was doomed by "General Russian Winter," and that though the Grand Army might vent its rage on the empty capital, only a skeleton would recross the Niemen. Though the British burnt the Capitol and other public buildings in Washington, the Americans knew that the daring little force must retire or be destroyed at an early date. Admiral Duckworth could bombard Constantinople, but the amount of damage he could do was limited to the ammunition he carried in his ships, and the Turks knew only too well the losses he would suffer in his return passage through the Dardanelles. The lesson of these examples is that they could accomplish no good because they lacked moral effect. Air attack, it will be readily agreed, does not lack moral effect, nor is it a form of spasmodic effort as in the instances above. England without command of the air can be subjected to continual air attack. The

enemy who is within air striking distance can destroy cities and industries, can paralyse mobilisation of other forces, can take the lives of citizens, and can deprive of their daily bread those who escape death by violence.

How long could any nation stand such a strain?

What Government could survive a declaration to hold out?

That this picture, terrible as it may seem, is no wild figment of an untutored imagination is borne out by the opinions of many of the most eminent soldiers of the day.

Admittedly, air attack is indiscriminate, and it kills the finer feelings of combat associated with war up to 1914. "Gentlemen of France, fire first" is an anachronism, as was learned in the late war; in the next it will be even more so. Modern war calls the entire nation to arms; the aeroplane is the enemy of every citizen of the hostile nation. The late war taught the bitter lesson that the limits of what is permissible in war is in many ways elastic, and a new weapon opens up its own paths. It is deplorable that war should have reverted to the methods of Attila, but the fact that this is so must be faced; mere regrets will not protect the homeland. Let it be realised that the boast of Prince Eugene of Savoy that the peasant could till the field in the neighbourhood of his camps is but a pleasant dream of the past, and let us prepare accordingly.

Nor is the extension of war to non-combatants the only apparition which wounds the feelings of chivalry. Aircraft, by reason of their mobility and their perpetual readiness for war, expose an unsuspecting nation to attack by an unscrupulous enemy *without any declaration of war*. There are nations which would not hesitate to seize the advantages which such a course would assure, Bernhardi had considered it in regard to England before the late war.[1] Clausewitz, writing on the same subject, says: "There is no custom of war which an unscrupulous and powerful State will not interpret in its own way, or violate with impunity should this be necessary for it to obtain its object, and the opprobrium of other States is of little moment if the object be gained."[2] Modern history furnishes an actual example of this kind in the Japanese attack on a portion of the Russian fleet in 1904, for, though war had been declared, the attack followed so swiftly on the declaration that the Russians found themselves engaged before they were aware that a state of war existed.

Aircraft might almost be said to cater for the unexpected attack, and knowing the chivalry of modern democracies, the unexpected air attack must be provided for in so far as any attack of this type can be provided for. That is, an air force of such strength must be maintained that adequate vengeance is within its scope immediately on the cessation of the first enemy attack. Further, in order that our aircraft may survive the simultaneous attack which would most assuredly be directed against our air bases, aeroplane hangars must be situated underground, and aerodromes must be equipped with

[1] "Germany and the Next War," page 156, F. von Bernhardi.
[2] "On War," Book I., von Clausewitz.

installations for dispelling the gas which the enemy would deposit in large quantities in their vicinity.

Not only is Great Britain more exposed to aerial than to other forms of attack, but, in addition, the following points must be borne in mind :—

(i) The comparatively low cost of an air force increases the number of potential enemies. Thus, countries such as Holland, Denmark, and Belgium, if they concentrated on air power, would be in a position to menace Great Britain.
(ii) It is the most economical weapon with which to attack.
(iii) The time and radius within which it can be delivered make surprise attack easy.
(iv) It is the most effective in proportion to the forces engaged, nor is the effect confined to the material damage caused.
(v) Civil aircraft can be rapidly converted to bombing purposes, just as one hundred years ago the merchant ship could be rapidly transformed into a privateer.

The air menace exists, it is at the door of the Empire, and though the British are a conservative people, conservatism must be abandoned where it affects the development of the new arm. It was this type of conservatism which permitted Napoleon III. to steal a march on us in the matter of ironclads; which retained wooden boarding pikes in the Navy until 1887,[1] and in 1828 which caused the Admiralty to write in reply to a request for a steam mail service between two Mediterranean ports that "They felt it their bounden duty to discourage, to the utmost of their ability, the employment of steam vessels, as they considered that the introduction of steam was calculated to strike a fatal blow at the naval supremacy of the Empire."[2]

Preparatory to a consideration of air attack, emphasis must be laid on the fact that an air force cannot be extemporised at the call of war; it must have a secure foundation sunk in the soil of peace, only thus can it be expected to meet the initial actions of the enemy. The experience of the Americans in 1917–18 illustrate this point, on which the chief of the United States Air Staff writes: "Owing to the many technical problems which had to be solved, to the many difficulties connected with the procurement of equipment which had to be overcome, and to the considerable time that it takes for training, it has been shown that it takes longer to place an efficient Air Service in the field than is the case with any other arm of the Service. In all planning for the future this fact must be given full consideration."[3]

Turning from the question of preparation, the cardinal point of defence against air attack is that it can only be met by an air offensive.

[1] "Memoirs," Lord Fisher.
[2] "The Evolution of Naval Armament."
[3] "Final Report of the Chief of the Air Staff, American Expeditionary Force," 15th February, 1921.

An intricate organisation consisting of aircraft, anti-aircraft guns, searchlights, sound locators and balloon aprons must be set up for local defence; but it must be remembered that it is only local defence, and possesses all the limitations of local defence as they apply to any force. In addition to this the aeroplane, more essentially than any other, is a weapon of offence. It is the deliberate opinion of all those most competent to judge, that an aeroplane is an offensive and not a defensive weapon. Owing to the unlimited space in the air, the difficulty one machine has in seeing another, the accidents of wind and cloud, it is impossible for aeroplanes, however skilful and vigilant their pilots, however powerful their engines, however numerous their formations, to prevent all of the machines of a hostile force from reaching their objective if they have the initiative and determination to do so. Only the minimum number of aircraft necessary to reassure public opinion should be retained on the defensive.

Though it is recognised that in land warfare the defensive is sometimes necessary even in the most offensive of operations, or as Clausewitz says: "The offensive is no homogeneous whole, but is incessantly mixed up with the defensive," in the air there must only be one policy—a ruthless offensive directed against—

(*a*) enemy aerodromes,
(*b*) enemy aircraft over enemy territory,
(*c*) political, military, and naval objectives in enemy territory.

When (*a*) and (*b*) have achieved air supremacy, the enemy will be compelled to employ the bulk of his air resources on local defence at the dictation of public opinion, which is a force that thinks, not in terms of the ultimate object, or of strategy, but in terms of its own immediate safety, and it is that way that defeat lies.

Before leaving the subject of air attack directed against an enemy's capital, cities, industries or shipping centres, it would be well to point out that such objectives do not constitute what has hitherto been termed the geographical objective, nor does air attack avoid the issue of defeating the enemy's forces. On the contrary, these objectives cannot be reached until his forces are overthrown. The difference lies in the forces which must be overthrown; in this case these are his air forces. It is not the actual defeat of an army which influences the vanquished nation, rather is it the thought of that to which the nation is exposed by the defeat of its army. If a nation is exposed to these misfortunes even though its army be intact, the influence towards peace is produced just the same, nor can a modern army exist as an efficient fighting force if national *morale* has deserted it and left it like a sword without a handle.

12.—*Sea-borne Attack.*

In discussing sea-borne attack against these islands, the question of naval supremacy will be set aside for the moment, and the problem

considered from the point of view of air power. The Navy constitutes the main security of our ports against sea-borne attack, but realising that naval action alone cannot guarantee immunity from attacks by hostile war vessels which may escape the vigilance of our fleets, other forms of defence have to be provided. Thus, up to the present, coast defence has been distributed as follows :—

(*a*) The battle fleet - Offensive.
(*b*) Defence flotillas - Offensive-defensive (but being mobile naval units these cannot be regarded as tied to port defence).
(*c*) Coastal artillery - Defensive.

History proves that even an enemy inferior at sea will from time to time attempt operations against a port, with the intention of either—

(i) depriving his adversary of the use of that port or base;
(ii) damaging or destroying the war vessels inside the port or base; or
(iii) alarming public opinion, so that his adversary will be compelled to immobilise a part of his striking force, as were the Americans in 1895.

In order that the battle fleet may be effected as little as possible by the demands of coast defence, it has hitherto been the policy to provide heavy coastal artillery at each port or base of importance, the amount so provided being determined by the scale of attack anticipated at any individual port. The country is thus committed to the expense of providing heavy ordnance at all possible objectives of the enemy, although in the majority of cases it is unlikely that this outlay will bear fruit against the enemy.

Surely the air force provides a weapon by means of which dispersion of force on the part of the Navy can be avoided, and expenditure saved by the elimination of immobile and expensive armament which may never be used. Coast defence can then be provided for by—

(*a*) The battle fleet - - - Offensive.
(*b*) Aircraft - - - - Offensive.
(*c*) Mines - - - - - Defensive.

To examine the proposition in detail: the immobility of heavy ordnance can be reduced to a certain extent by the use of railway mountings, but this cannot be done *in extenso*, and in any event the mobility thus conferred is infinitesimal when compared to that of the bomb-carrying aeroplane. Sufficient mobility is not conferred to obviate the possibility of a certain port being left defenceless by a *ruse de guerre* on the part of the enemy. Again, in order to bring accurate fire to bear on the hostile vessels, the guns, which will be extremely long range, must have aerial observation. Thus, under the present system, not only are the guns in themselves immobile, but they immobilise the aircraft allotted to their assistance.

Bombing aircraft, warned by reconnaissance machines of the approach of the enemy, will be in a position to attack him long before he is within reach of his objective. With semi-obsolete craft an enemy might be prepared to risk their total loss provided he could damage some objective which he considered sufficiently important to warrant the loss. Gun defence permits him to get within range of his objective and accomplish some damage, if not a considerable amount, before he is destroyed. Air defence, however, exposes him to attack when he is many hours' steam from his objective, and renders him liable to total destruction before he is in a position to accomplish any damage whatsoever.

Aircraft are now in a position to deal with an enemy attacking by night, and in this respect will enjoy a supreme advantage over any other form of defence. The Americans have invented and used a flare of over 500,000 candle power, which illumines an area of over 5 square miles. One of these flares, dropped in the vicinity of the enemy's gun flashes, will reveal his vessels and expose them to as accurate a bomb attack as by day.

Distant controlled boats filled with high explosive and controlled by aircraft are a form of passive defence which might solve the problem of defence against night attack.

Under no circumstances should aircraft employed on coast defence be dispersed throughout the country. They should be concentrated at a few central positions in the vicinity of the coast, so that the maximum strength will be launched against the enemy. The warning given by the reconnaissance craft will, if necessary, allow ample time for any minor movements which may be essential. Should the nation, on the other hand, find itself at war with an enemy who is not in a position to undertake this form of attack, power is not wasted as is the case with heavy ordnance; the air units can be employed with the main force elsewhere. Fortification is a disease affecting moribund empires; modern war moves too rapidly for the permanent fortification. Here again the question is not only one of efficiency, it must also be considered financially. In our present circumstances the only policy is to concentrate attention on vital expenditure, and the most vital expenditure is that which ensures the possibility of offensive action. Expenditure on aircraft furnishes this assurance; expenditure on coast defence armament does not.

In the opinion of the Joint Board of the United States Army and Navy, which recently made a thorough investigation of the possibilities of aircraft for this purpose, "Aircraft possess important strategical and tactical qualities in operations of Coast Defence. In adequate quantities they may be a decisive factor in such operations."[1]

It must not be forgotten that one of the most dangerous forms of attack against a port would be by low-flying bombing aircraft, possibly in conjunction with submarines and coastal motor boats. Such an attack

[1] "Report of the Joint Board of the Army and Navy," August, 1921.

would offer prospects of inflicting loss on important naval units out of all proportion to the value of the attacking craft, and such attack can only be provided against by a sound air defence organisation, not on local, but on broad lines.

13.—*Invasion.*

The subject of invasion may be dismissed in a few lines. No Power would attempt a military invasion of these islands for the following reasons :—

(i) Aircraft can accomplish the same object far more effectively at a tithe of the risk and expense.

(ii) Aircraft could detect the approach of and deal with a hostile convoy some twenty hours before the slow moving transports could reach these shores. The effect of bombing on crowded and lightly hulled transports is beyond dispute.

(iii) It would be impossible to even embark the invading force if the enemy base was within radius of action. Secrecy as to embarkation would be almost impossible for the enemy to maintain.

(iv) Even presuming that the enemy eluded observation, it would take forty-eight hours in calm weather to disembark 70,000 men on a coast such as that between Plymouth and Dover.[1] Consider the position of this helpless mass of transports exposed for forty-eight hours to continuous submarine, bomb, and machine-gun attack. In 1905, Mr. Balfour, then Prime Minister, stated that " no British Admiral would regard the convoying of vessels carrying 70,000 men across at least 75 miles of sea, and their subsequent protection for two days and two nights in positions not only fixed, but perfectly ascertained, in waters swarming with torpedo craft and submarines as other than the enterprise of a lunatic. And what a British Admiral would regard as insane is scarcely likely to be considered as practicable by sailors of other nations."[2]

Add to this the effect of aircraft, and it may be safely concluded that invasion in modern times is an unlikely contingency.

It is, however, possible that an enemy might attempt to land a few picked men by aeroplane under cover of darkness in the neighbourhood of an important objective which could not be easily destroyed by bombing but which could be easily blown up, *e.g.*, the Forth Bridge. Air supremacy and an efficient anti-aircraft Service (sound locators) are the only antidotes to this possibility.

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[1] " Imperial Defence and Closer Union," d'Egville.
[2] Mr. Balfour, House of Commons, 11th May, 1905.

CHAPTER VI.

Overseas Defence.

Who touches my brother, touches Tavanne.—*Duc de Guise.*

14.—*Dominions.*

The changed status of the Dominions, which has been gradually coming about for the past twenty years, but which has been sealed by the events of the late war, demands that the Dominions, now that they are co-equal partners in the British Empire, should shoulder a larger portion of the organisation for Imperial Defence than they have done hitherto. Right willingly did they respond to the call of defence in 1914, and magnificent was the assistance they gave, but the change of the world situation, the financial exhaustion of Great Britain, and the increased likelihood of an attack directed at one or more of the Dominions, necessitates a sound preparatory organisation on their part to meet such an eventuality. The conditions of modern warfare make it probable that great events will immediately follow, if they do not actually precede, a declaration of war. If, therefore, organisations have to be improvised, staffs created, aircraft and equipment provided and plans matured after the outbreak of hostilities, the value of any assistance, however willingly and enthusiastically given, will be greatly lessened, even if such assistance be not altogether belated. The Dominions must not only be willing, they must be ready to defend the Empire at any point of attack. That is, they must each set up an organisation which is capable of holding off an enemy until assistance arrives from Great Britain, or which is capable of immediately assisting Great Britain in the event of an attack on the latter. The first interest of the Dominions is, of course, their own immediate protection against the form of attack to which each one is most exposed; it is therefore proposed to examine the case of each Dominion separately.

Australia and New Zealand.

Australia is a country under-populated and overstocked with the undeveloped resources which make for prosperity; it is in consequence a serious temptation to a nation situated, for example, as is Japan with its tremendous population and no normal outlet for their subsistence. If Australia neglects to provide for the contingency which this picture conjures up, she merely throws additional temptation in the path of Japan, which may some day react on our Imperial resources. Both Japan and Australia are island nations situated in the same seas; Japan is one of the world's strongest sea powers; it is sea power therefore which is of primary importance to Australia, whose own interests demand a generous contribution to the Royal Navy, nor should such contributions be rigidly maintained in Australian waters in times of stress. Australia cannot hope to rival Japanese sea power, it should therefore be borne

in mind that Japan has already beaten the fleets of one Great Power in detail; a second Tsu-shima should not be offered to her.

Though naval armament is the primary need of the Australian Commonwealth, the importance of aircraft as an auxiliary to the Navy and for coast defence purposes should not be overlooked. Owing to the enormous extent of the vulnerable Australian coastline, aircraft are the only medium of coastal defence; any other policy would not only be ineffective, it would be extravagant. In a country like Australia there is ample scope for the peaceful employment of coast defence bombing aircraft at times when hostilities are improbable, money is not therefore sunk in an entirely unproductive arm, and if the political situation so demands it, their mobility allows of rapid concentration at important strategic points. The paucity of communications in Australia definitely immobilises any heavy ordnance which may be sited at important bases, nor for that matter can the country afford to provide heavy artillery and their accompanying aircraft at these places in sufficient quantities to be effective. The following contribution to the air power of the Empire is suggested for Australia:—

Naval Co-operation.	Two Aircraft Carriers.	1 Reconnaissance Sqdn. 2 Fleet Spotter Sqdns. 1 Fighting Squadron.	Regular Units.
Coast Defence and Imperial Contribution.	1 Regular Fighting Squadron. 3 Territorial Fighting Squadrons. 2 Regular Heavy Bombing Squadrons. 18 Territorial Heavy Bombing Squadrons.		
Army Co-operation.	1 Regular Co-operation Squadron. 2 Territorial Co-operation Squadrons.		

The number of fighting squadrons is placed at a low figure, by reason of the fact that any challenge to Australian air supremacy would necessarily be small, in that it would be based on aircraft carriers.

New Zealand's defence policy would be on similar but smaller lines to that of Australia.

Canada.

Canada is exposed to attack in two directions—

(i) On the western coast, by Japan or the U.S.A.
(ii) On the southern frontier, by the U.S.A.

Attack directed against the western coast of Canada can be countered by a sound system of coast defence aircraft based on Vancouver Island. Two squadrons of heavy bombing aircraft, supported by a squadron of fighters could deal with any sea-borne attack, the latter being incapable of offering a serious challenge to the maintenance of local air supremacy. If these units were based at Quatsino they would be in a position to command the approaches to any point on the western coast of Canada.

Canada, though ever ready to put forward her men and her resources whenever the Empire is threatened, is nevertheless slow to expend money on any organisation for her own defence in time of peace. To a certain extent this is due to a belief that she is protected from ex-American aggression by the Monroe Doctrine, behind which, as expressed by Sir Frederick Borden, " were the guns and warships of the United States and the whole power of eighty million souls."[1] But the theory thus ably put forward presupposes eternal friendship between Canada and the United States. It has been almost an unwritten law for many years that war between Canada (*i.e.*, the British Empire) and the United States must not be discussed, for a war between nations so intimately connected is impossible by reason of ties of blood and friendship. Such a doctrine presupposes the impossibility of civil war, a suggestion we know to be incorrect. If the Federals and Confederates were capable of fighting a bitter war for four years in the middle of the last century, if the Americans were capable of attempting an invasion of Canada in 1812, surely it is possible that, under certain circumstances, a *casus belli* might arise again. In any event, though a war with the United States would be a matter to deplore and one to be avoided where prestige permits, it is but sensible to consider the eventuality and the action to be taken should it arise. It should not be forgotten that the United States on their side have fully considered and at various times provided for the invasion of their country by way of Canada.[2] Nor is there any inconsistency in anticipating peace with America while discussing what seems desirable for the security of the frontier of her friend and neighbour, Canada. A frontier left open to invasion is a fruitful cause of war itself, and has produced bad feeling between Great Britain and the United States on more than one occasion in the past, *e.g.*, the Patriot Raids, 1837, and the Fenian Raids, 1866.

In Canada's case a navy is not of primary importance by reasons of the fact that—

(i) On the western coast she could be protected by aircraft, as already explained.

(ii) On the eastern coast she can rely on the power of the British navy.

It is to her southern frontier that Canada must look, and in providing for its defence she will be organising a force available for use in any part of the Empire in which it might be required in the future.

The southern frontier of Canada possesses this peculiarity, that though it is nominally a land frontier for which a military force would be the normal defence, the part of the frontier along which operations would develop is neither sea nor land, it is lake and river; this over a frontier area of one thousand nine hundred miles. That operations would chiefly be along this frontier is beyond doubt, as proved by the

[1] Speech by Sir Frederick Borden, Ottawa, 23rd February, 1906.
[2] *Chicago Tribune*, 30th January, 1898.

war of 1812–13, and as the industry and seat of government of both countries is in the west. Canada must therefore be in a position to protect this frontier, not only with military forces where the dividing waters are narrow, but she must also obtain supremacy over the waters of the lakes. Writing to Sir George Murray in 1814, Wellington said: "I have told Ministers repeatedly that a superiority on the lakes is a *sine qua non* of success in war on the frontier of Canada," and what was true in 1814 is equally true to-day.

Now, there is no point on any of the lakes which is not within easy radius of action of aircraft operating from either shore, and in consequence any naval craft of the type which could operate on the lakes would be at the mercy of the side which could obtain aerial supremacy. Air supremacy is therefore a *sine qua non* of successful defence of the frontier. Canada must concentrate on air power, chiefly on a territorial basis, and that portion organised on a regular basis, can amply repay expenditure in peace by its utility for survey and forest fire purposes; aircraft are already extensively employed in Canada for the latter.

There is one other point in regard to Canadian air power which merits consideration. The majority of important Canadian cities are within easy reach of bombing aircraft based on American territory, but, on the other hand, should Canada be in a position to attain aerial supremacy, Chicago, Boston, Pittsburg, and New York would be within bombing radius of aircraft based on Canadian territory, a threat which the United States would not be slow to appreciate.

South Africa.

South Africa is least likely of all the Dominions to encounter external aggression, but her pre-war unconditional contribution of £35,000 annually to Naval Defence and her contributions in the late war show that she appreciates the fact that her security is due in a large measure to her partnership in the British Empire. She should organise, and in fact has already commenced to organise a small air force for coast defence purposes and as an available contribution to Imperial resources should the necessity arise.

It is essential that, in so far as is possible, the aircraft, their method of operation, and the training of personnel, should be standardised throughout the Empire. The necessity for standardisation of armament was clearly demonstrated by the misfortunes which attended the equipment of the Canadian forces with the Ross rifle in the earlier part of the late war. There should also be a constant interchange of staff personnel between the Dominions and Great Britain, and in addition the Dominions must be represented both on the Imperial General Staff and at the War Office, Admiralty, and Air Ministry. Finally, the Dominions, by developing their aircraft industries, should make themselves independent of the Mother country for purposes of supply. Such a course will ensure

large production in time of war, and the provision of aircraft should Great Britain be temporarily isolated at any time.

15.—*Colonies.*

It has already been pointed out that the increased cost of armies, the increased world unrest, and the increase in our commitments are throwing an almost intolerable strain on the financial resources of the Empire. The far-flung garrisons of the Roman Empire sapped its military and financial strength to such an extent that, to reinforce one threatened point, other almost equally restive areas had to be denuded. The garrisons which in the last years of his power Napoleon was compelled to furnish throughout Central Europe, finished what Moscow had begun. No nation can disperse its military strength to the four winds and live. It is therefore suggested that aircraft supply the only solution to the economical garrisoning of our more turbulent colonies.

The duties of military garrisons are to provide against internal disturbances and external aggression. To carry out these duties in such extensive and troublesome countries as Mesopotamia, India, Palestine, and Egypt, a very large military force is required. The force must be of sufficient size to—

(i) Show the flag and support the civil administration, duties which often involve long and dangerous lines of communications.
(ii) Quell a rising before it has assumed serious proportions, which requires great mobility and ease of concentration.
(iii) Extricate detachments which may be in difficulties—also requiring great mobility.

The history of Mesopotamia since the war furnishes an example of the enormous garrison which is required to fulfil the above duties. At the commencement of the rebellion, in 1919, the military garrison, great though it was, had neither the strength nor the mobility to quell the rising in its initial stages, and, subsequently, when Indian reinforcements arrived, many relief forces had to be organised and despatched to the rescue of invested detachments at Shahroban, Kufa, Rumaitha, Samawa, and other places. The history of the frontier garrison of India teems with incidents in which it is necessary to send out at once a small force to punish marauders or a rebellious village. Secrecy is absolutely imperative in these small operations, and in a country where news flies on the wings of the wind, such secrecy is difficult to maintain. Hearing that a small force is deeply committed to the intricacies of their country, the tribesmen assuredly concentrate and suddenly attack, with the result that it is often necessary to undertake large and expensive relief expeditions. Though the examples of successful raiding parties by infantry and cavalry on offending villages are many, it will be conceded that unsuccessful examples are in the large majority. Thus the two essentials for successful punitive expeditions are secrecy and speed, both are easily attainable with aircraft. The punishment, like the

news, will fly on the wings of the wind, but it will have some hundreds of horse-power propelling it through the air, with the result that the first warning the offending native will receive will be the arrival of the aeroplanes over his habitation.

The fighting man of the Asiatic tribes carries his own food, kit and ammunition, and consequently he fights free of communications, but he possesses uncanny ability in worrying ours. What this means may be gathered from the fact that in the Afghan campaign of 1878–80 it was found that one hundred men per mile were required to keep open the communications of a force of ten thousand men. But move the aircraft base to within two hundred miles of the area of operations and no communications are required in the turbulent territory. The native is deprived of his first joy—loot.

A large percentage of these tribes fight for the mere pleasure of fighting. They are past masters in the art of guerilla warfare, in which we may hope to equal, but can never surpass them. We oppose the tribes with infantry, the arm which supplies them with the fight. Substitute aircraft, and they are dealing with a weapon which they cannot counter. The native is deprived of his second joy—fighting.

The tribesmen of Mesopotamia and of the Indian frontier have one outstanding ambition, namely, to possess a rifle. Send infantry to fight them and they are afforded an opportunity through casualties of gratifying that ambition. Substitute aircraft, and the native is deprived of all prospects of his third joy—rifles.

Tribesmen are the most mobile fighters in the world; it will be readily agreed that organised infantry cannot compete with them in this respect. Substitute aircraft, and the mobility of the native fades into comparative insignificance.

An air force based on strategic points, which, to avoid dispersion must be few in number, is believed to be capable of controlling an area the size of Mesopotamia. Subsidiary aerodromes or landing grounds must be established at points of less strategic importance within radius of action of the main bases, and must be guarded by small forces of infantry. Thus, in a country like Mesopotamia, aircraft established at two concentration areas, supplemented by six or seven subsidiary landing grounds, will place any part of the country within six hours' flight of the main aerodromes. This means that within six hours of the receipt by wireless of a demand that a force of aircraft is required either to demonstrate over, or punish a certain village, the force will have arrived and the disorder have been dealt with in its initial stages.

It is not for one moment intended to suggest that aircraft alone can garrison any country without military assistance, but rather to show that economy in military strength and in money may be effected by a more extensive employment of aircraft. Each subsidiary landing ground must be fortified and protected by a small detachment; the main aerodromes must be protected by a substantial force, say, one brigade; this brigade would also form a reserve for general employment

in case of necessity. It is at its base that the aeroplane is defenceless; aircraft rely on military power to furnish base protection. In the event of one or more of the detachments at subsidiary landing grounds being invested, reinforcements can be rushed to their assistance at the rate of eighty miles an hour. Aeroplanes have now been constructed to carry ten men, each fully armed and rationed.

The actual power of aircraft to overawe the tribes into submission is beyond dispute, it has already been proved in Mesopotamia. Of their power in that country, Sir A. T. Wilson, late Chief Political Officer, states : " I have every confidence in the ability of the Royal Air Force to lend powerful aid to the civil power in the maintenance of order in Mesopotamia and N.W. Persia without the intervention of troops."[1]

Like every other weapon, aircraft must be applied on certain recognised principles. Ignorance or disregard of these principles, particularly in operations against uncivilised enemies, nullifies its advantages, and may leave it a broken sword in the hand of a commander. These principles may be summarised as follows :—

(i) Air units must not be split up in detachments. The Air Force is a highly technical Service, which requires careful provision of spares and the close supervision of senior officers. Detachments are an evil to all forces, but particularly so to air forces.

(ii) To obtain the required effect, aircraft must be used with vigour. Nothing will more readily kill the respect of the native for air power than a weak application of that power. Not a moderate, but a maximum weight of bombs must be dropped once it has been decided that force is necessary. The evils of intermittent and spasmodic bombing have already been demonstrated; bombing must be continuous by day and by night until the object for which it has been undertaken is achieved.

(iii) The decision to undertake bombing operations should only be made as a last resort. The very ease with which bombing operations can be initiated exposes the arm to abuse; actual operations should not be commenced except at the request of a competent civil authority and under the control of the Air Officer Commanding.

Aircraft should be applied in the first instance so that subsequently the mere threat of bombing should bring about the required result. Normal patrols for the purpose of " showing the flag " should then be sufficient to remind the native of the power that lies behind.

16.—*Defence of Overseas Ports.*

Aircraft, the most mobile of weapons within a certain range, are the most immobile of weapons outside that range if their movement involves a sea journey. An average type of squadron, in addition to

[1] R.U.S.I. JOURNAL, May, 1920.

requiring accommodation for officers, men, and forty-two vehicles, requires a total weight of eight hundred shipping tons, and even then only vessels with the largest hatchways can accommodate aeroplane cases. Add to this the time and labour required to dismantle and pack, and to unpack and erect the aircraft, and it will be obvious that, except in special instances, the allocation of air units to coaling stations abroad means dispersion of force in its most undesirable form. If Great Britain possessed an air force of such strength that it could afford to tie up units at small ports abroad, then the defence of those ports would be materially improved, but for the present we do not possess such an air force, and must therefore avoid dispersion. In allocating an air unit to a naval base abroad, it must be considered whether the advantages thus gained outweigh the loss to the air forces as a whole. If they do outweigh the loss, then the base in question must have its aircraft. Malta is an example of this latter case. Air power is essential in the Mediterranean, both in itself and because aircraft are essential to the Mediterranean Fleet. In addition to being the base of the fleet, Malta is a convenient air base for operations in the Mediterranean; further, its immediate defence is strengthened by the presence of aircraft.

On the other hand, consider Hong Kong; there is no doubt that the defence of this island would be considerably strengthened by a force of aircraft. But Hong Kong is an island adjoining the mainland, and except for a few square miles which is leased by Britain, that mainland is foreign territory, therefore Hong Kong is exposed to land attack in addition to sea-borne attack. Now, in the case of an island naval base situated far from a mainland, the only form of air attack to which it is exposed must be sea-borne, that is, air attack based on aircraft carriers, and consequently, being on a small scale, it could be dealt with by a small force of aircraft based on the island. In the case of Hong Kong a very large air force would be required, in that air attack directed against the port, being based on the mainland, could be developed on an unlimited scale. Unless a large air force was maintained on the island, air supremacy would be easily attained by the enemy, and the defence aircraft rendered impotent even for spotting purposes. An enemy meditating the seizure of Hong Kong (*e.g.*, China) would establish himself on the mainland in great strength at a distance of about one hundred miles, and reduce Hong Kong by air attack in a very short space of time. Gibraltar is in the same category as Hong Kong, with the additional disadvantage of being a most unsuitable base for aircraft.

Aden and Singapore are more fortunately situated in that they are exposed only to sea-borne air attack, and in consequence a comparatively small air force would be adequate for their air defence. In the case of Aden, aircraft would be invaluable, not only for defence against sea-borne attack, but also for use against the unruly tribes who inhabit the country behind it.

CHAPTER VII.

Air Power and Land Warfare.

The aeroplane has become an indispensable adjunct to military operations. —*Loringhoven.*

17.—*Aircraft and the Army.*

General von Freytag-Loringhoven's statement might almost be regarded as a platitude. The Greeks and Turkish Nationalists may wage war in 1921 with almost negligible assistance from aircraft, just as a schoolboy possessing no knowledge of boxing may fight and defeat an equally ignorant classmate; but a force devoid of aircraft opposed to a force well-equipped with aircraft would be in a position almost as ridiculous as that of a war profiteer compelled to contest the heavy-weight championship of the world. The point cannot be too strongly emphasised that the position of a force which may possess aircraft, but which has been deprived of air supremacy is little better than that of a force which possessed no aircraft in the first instance. In the late war both sides developed their air forces proportionately, both starting on a very small framework; both were therefore capable of attaining a temporary superiority at an important point, but neither side really experienced a total loss of air supremacy. The Germans during the Somme battle, in 1916, had practically lost the use of the air over the battle front, but by a vigorous effort in reorganisation, production, and training during the winter of 1916–17 they rendered themselves capable of contesting British and French air supremacy in the following year. General Liman von Sanders, who was entirely denied the use of the air, attributes no small measure of his defeat in Palestine to this factor.

It is unnecessary to enlarge on the value of aircraft for reconnaissance, for artillery observation, for interruption of enemy communications, and for moral effect on tired units temporarily withdrawn from the struggle. For the latter purpose it must be borne in mind that the mere presence of a hostile aeroplane overhead inspires those on the ground with exaggerated forebodings of the damage, in itself considerable, which it can inflict.

The western front in the late war did not afford an opportunity by which the value of aircraft in the pursuit of a beaten enemy might be demonstrated. The Palestine front, however, did afford such an opportunity. The Turkish forces were retreating along the road which crosses the Jordan at Jisr ed Damish, the only road open to them. At one point this road runs through a gorge, which aircraft fitted with wireless were detailed to watch. On the morning of 21st September, 1918, the head of a big Turkish column moving East was seen approaching the gorge; this information was wirelessed back to Air Force Head-quarters, which at once despatched every available machine to bomb the head of the column. Having completely blocked the road through

the gorge, the aeroplanes then attacked the rest of the column with machine guns and bombs. The whole Turkish force disintegrated, abandoning its arms, guns, and transport; eighty-seven guns were found along one stretch of five miles of road.

Clausewitz says that strategy has the right to demand from tactics that a victory shall be completed by pursuit,[1] the vanquished if not pursued with vigour will reorganise his forces for another effort so soon as he has shaken off his enemy. History teems with illustrations of campaigns almost won, but subsequently prolonged, if not actually lost, by neglect or inability to pursue the enemy. The Confederates at Bull Run furnish the classic example of the consequences of failure to exploit a victory. The Austrian escape after Königgrätz, the lack of energy displayed by Frederick the Great after Mollwitz and Hohenfriedberg, the consistent escape of the French in the opening stages of the Franco-Prussian War are but a few of the examples of the necessity for pursuit. Though the value of pursuit is well known, it is often the case that the victorious commander is unable to apply his knowledge by reason of the exhaustion of his troops. Aircraft furnish the solution to the problem presented by exhaustion. The troops, the mechanical transport, and the rolling stock of the enemy is at the mercy of the vigorous aerial pursuit. Those who have witnessed an army in retreat will agree that it requires little imagination to visualise the effect on troops (already shaken by their previous experiences in the battle) of an attack of this nature.

In defence of a fortress aircraft would be invaluable both for the location of the besieging batteries and for observation of fire. In August 1914 Fournier was severely handicapped by lack of aircraft in the defence of Maubeuge. Commandant Cassou, his chief of staff, relates that "the want of aircraft throughout the siege severely handicapped the defence."[2] Aircraft allocated to fortress defence need not be lost to the main body when the fall of the fortress seems inevitable. Under cover of darkness aircraft should be able to regain the main forces, provided the latter are within range. It seems, however, unnecessary to enquire in detail into the value of aircraft to fortress defence; modern artillery has sealed the doom of this form of permanent passive defence on land frontiers. As the history of investments, from Alisia down to Metz, proves, a fortress is merely a temptation to a retreating army. An army can easily be got behind fortifications, but only with difficulty can it be got back again into the open field. A modern fortress of only moderate importance requires a garrison of twenty-five thousand men; five such fortresses absorb an army. Of how little use to France was the one hundred million pounds which she spent on frontier fortification between 1871 and 1914, and to how many better purposes could not such a sum have been devoted?

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[1] "On War," Clausewitz.
[2] R.U.S.I. JOURNAL, August, 1920.

It is of interest to investigate the assistance which a force of modern aircraft could lend to an army which had landed on the Gallipoli Peninsula under the same circumstances as in 1915.

The whole of the Turkish reinforcements and supplies had to be brought to the front either in dhows by way of the Sea of Marmora to Galata, or by road through the bottle neck of the peninsula, three and a half miles wide. In the latter case, the approach was *viâ* the railway from Constantinople or Adrianople to Uzun Keupri, and thence by light railway to Keshan or Malgara, leaving a road journey of twenty-six miles to the neck of the peninsula. On the other hand, the railway from Constantinople to Rodosto could be utilised, but it left a road journey of seventy miles *viâ* Malgara, at which place traffic would have had to mingle with the traffic from Uzun Keupri. When it is considered that reinforcements and supplies for the whole Turkish force in the peninsula, amounting to 175,000 men, had to be conveyed by these few routes, it can easily be imagined how vulnerable would be the situation of the Turk if his communications could have been severed.

An air force consisting of four bombing and two fighting squadrons, based on the island of Imbros, would place the entire line of Turkish communications, whether by sea or by land, within easy bombing radius. Two squadrons could be employed to bomb Keshan (58 miles from Imbros), Malgara (70 miles), Rodosto (100 miles), Uzun Keupri (90 miles), and the roads leading to the neck of the peninsula from the north and north-east. All enemy supplies would then have to pass through this bomb barrage. In addition, two bombing flights and the two fighting squadrons could be employed on the attack of all traffic endeavouring to pass through the neck of the peninsula. One bombing flight could be employed solely for the bombing of Constantinople, one hundred and seventy miles from Imbros, and therefore within easy range. The remaining bombing squadron to be equipped with large numbers of light bombs and to be employed against the dhows passing down the Sea of Marmora. A bomb carries, roughly, five times as much explosive for its weight as does a shell; thus a squadron of Vickers-Vimy's bombing Uzun Keupri could in a single raid drop a weight of bombs on the railway junction equivalent to four thousand three hundred and thirty-five 18-pdr. shells. It will thus be obvious that the problem of keeping open the communications of the force in the peninsula in the face of our aerial supremacy would be an impossible one; the Turks, subjected to military pressure in front and air pressure behind, would have no alternative but to surrender, for the withdrawal of a force one hundred and seventy-five thousand strong through an isthmus three and a half miles wide, in the face of vigorous air attack, would not be a military proposition.

Again, modern aircraft based on the island of Cyprus, could have bombed the Baghdad railway continuously along a course of two hundred miles from Konia to Marash; no portion of the railway

between these two points is outside the radius of action of aircraft based on the island. The Turkish communications to Palestine and Mesopotamia would have been at the mercy of air attack.

CHAPTER VIII.

Air Power and Sea Power.

The fleet which possesses the best air service will win the next war.—*Admiral Lord Beatty.*

18.—*Aircraft and the Fleet.*

It is not contended in this chapter that air power is more essential to Imperial defence than is sea power, for who would deny that "Le Trident de Neptune est le sceptre du monde." It is, however, suggested that sea power is not now attainable solely by naval power. Rather is it by a combination of naval and air power that sea power, the spine of Imperial defence, must be maintained. The relation of air power to naval power teaches that forces can now be opposed by dissimilar forces; our fleet is no longer the sole offensive weapon against the enemy fleet.

The late war at sea furnished no satisfactory example of the power of aircraft against big war vessels. In fact the air attack on the "Goeben," when that ship grounded inside the Dardanelles, rather tends to illustrate the poverty of air attack. Recent experiments in America, however, show the matter in a different light, and prove that forces can now be opposed by dissimilar forces.

On the 18th July, 1921, the ex-German cruiser "Frankfurt" was attacked by six Martin bombers (Army) at a distance of seventy-five miles from the coast. Twelve 1,000-lb. bombs were dropped; the last bomb pitched alongside the forecastle, sinking the ship within a few minutes; twenty-one minutes from the commencement of the attack the ship had disappeared. Again, on the 21st July the ex-German battleship "Ostfriesland" was attacked by Martin bombers (Army) with 2,000-lb. bombs, and was sunk within twenty minutes of the commencement of the attack. (Owing to inaccurate bombing, an attack made on this ship the previous day had proved unsuccessful.) The outstanding features of these experiments were—

(i) That to sink a ship of war the bomb must not strike the ship, but must fall in the water close to this ship.

(ii) That the attacks were successfully conducted, not by naval, but by Army aircraft.

The Joint Board of the United States Army and Navy,[1] no member of which was an air officer, reported on these trials as follows :—

Within their radius of action, which, relative to that of naval vessels is extremely short, the effectiveness of heavier-than-air craft carrying large capacity high explosive bombs depends upon—

(*a*) Ability to locate the naval vessel.
(*b*) Ability to hit the target vessel with the projectile carried.
(*c*) Ability of the projectile to damage or destroy the vessel.

In regard to (*a*), aircraft have marked ability, either in combination or singly, to locate naval vessels operating within their radii of action.

In regard to (*b*), it is believed that, if an air force can obtain the mastery of the air, an effective percentage of hits can be obtained against surface vessels coming within the radius of action of bombing aeroplanes.

In regard to (*c*), aircraft carrying high capacity high explosive bombs of sufficient size have adequate offensive power to sink or seriously damage any naval vessel at present constructed, provided such projectiles can be placed in the water alongside the vessel. Furthermore, it will be difficult, if not impossible, to build any type of vessel of sufficient strength to withstand the destructive force which can be obtained with the largest bombs that aeroplanes may be able to carry from shore bases or sheltered harbours.

These facts speak for themselves; it must, therefore, be admitted that a battle fleet can, under certain circumstances, be successfully opposed by an air fleet.

How then is a decision to be reached as to the proportion of strength between sea and air forces which will secure the mastery of the sea?

The answer is dependent on the radius of action of aircraft. The aeroplane is supreme within its radius of action from a shore base (at present about 250 miles), but outside that radius the battle fleet is the dominant factor. It is outside the area of shore-based aircraft that opposing fleets will probably meet, it is there that the big ship and the big gun will reign supreme. Certainly no commander would bring his ships to action in an area where his fleet aircraft would be very much inferior and where he would encounter the double offensive of a combined air and fleet attack.

The determining factor of air power in relation to sea power is the radius of action of aircraft, and since this at present is not great, additional mobility must be obtained by providing mobile bases; hence the aircraft carrier. The aircraft carrier would appear at first sight to furnish the solution of increase in the area of influence of aircraft, but its very mobility precludes its use for large offensive purposes; that is, by reason of its size, the aircraft carrier cannot carry a sufficient

[1] The Board was composed of General Pershing, Acting Secretary Roosevelt and Senator Weeks. There were several naval, but no air officers, on the Board of Observers.

quantity of aircraft to form a threat to the existence of an opposing fleet. The great majority of the limited space in an aircraft carrier must be allotted to the type of aircraft essential for intimate co-operation with a fleet at sea; *i.e.*, spotting, reconnaissance, and fighting aircraft. Nor can the matter be simplified by the addition of vast numbers of aircraft carriers, for a superfluity of these vessels would prove a positive hindrance to the mobility of the fleet, as they are entirely defenceless and require adequate protection. The aircraft carrier is most vulnerable to both sea and air attack; of all vessels with a fleet at sea it is the easiest to sink by either bomb, torpedo, or gunfire. Even a few small bombs dropped by an enterprising hostile reconnaissance aeroplane, on its deck, will deprive the fleet of a large portion of its aerial observation and air protection. It must be admitted, therefore, that the maintenance of sea supremacy outside the limits of land aircraft is entirely a matter for the fleet, though, as aircraft radius of action increases this will become less so. The aeroplane, like the submarine, destroyer, and mine, has added to the dangers to which battleships are exposed, but has not made the battleship obsolete. The battleship still remains the greatest factor of naval strength.

19.—*Forcing Battle.*

The object of a fleet is to bring the enemy's fleet to battle, to destroy it, and thereby secure free passage of the seas to friendly vessels. If the enemy's fleet is inferior it will be his object to avoid battle, for a "fleet in being," as described by Lord Torrington in 1690, is a perpetual threat to an enemy. The inferior fleet avoids battle by taking refuge in a strongly fortified harbour, and modern history teaches that to force such a fleet from its retreat often necessitates expensive and tedious land operations, *e.g.* :—

Cervera's Fleet, 1898, Santiago Harbour.
Chinese Fleet, 1895, Wai-Hai-Wei.
Russian Fleet, 1904, Port Arthur.

Now, however, provided the superior side can establish a land base within radius of action of the port in which the enemy fleet is sheltered, and provided air supremacy can be attained, the enemy's fleet must either venture forth and give battle or perish at anchor. The Germans built enormous ferro-concrete shelters for their submarines at Bruges, but the provision of similar protection for a battle fleet defeats the imagination.

20.—*Co-operation with Naval Forces.*

The value of aircraft in close co-operation with a fleet is analogous to that of aircraft and land forces, discussed in section 16; it is obvious that it requires little discussion. For fleet reconnaissance they are absolutely essential. Referring to the Zeppelins in the late war, Lord

Beatty has said that one Zeppelin could do the work of six cruisers.[1] As the range of naval armament increases, so does the importance of spotting aircraft increase in proportion. In fact little need be said beyond the fact the provision of adequate air forces is now a recognised part of the equipment of a fleet.

Against the submarine, aircraft are invaluable. The submarine possesses one advantage over surface craft, namely, invisibility. Once located and kept in view, its low speed and manœuvring power renders it helpless. The aeroplane is the means of depriving the submarine of its invisibility. Many ingenious instruments and laborious systems have been used to locate the submarine, but none can compare with properly organised aircraft patrols. Further, these patrols are most efficient where they are most needed, that is, within 200 to 300 miles of our own shores; it is where trade routes converge, approaching our shores, that the submarine does most harm, and it is there that the shore-based aeroplane wields power.

Again, if a base can be established close to the point where enemy trade routes converge, aircraft will furnish a formidable weapon with which to menace enemy commerce.

Though the degree of influence exercised by aircraft on sea power may be open to dispute, there is no doubt that it would be difficult to imagine any class of naval operation, either offensive or defensive, in which aircraft could not only be usefully employed, but, moreover, in which they would not be indispensable.

CHAPTER IX.

AIRCRAFT IN SMALL WARS.

Alas, how dreadful to have wisdom, where it profits not the wise.
Teiresias.

21.—*Aircraft as the primary Arm.*

In describing the various forms of war, Field Marshal von der Goltz refers to a type which he calls "England's Constant."[2] Clausewitz refers to two types of war[3]:—

Type i.—Object: The complete overthrow of the enemy nation.
Type ii.—Object: Achievement of a minor point of policy.

It is this second class of war, which is "England's Constant"; but though these wars may be on points of small importance, they cannot nevertheless be undertaken on the lines of a limited liability company, for on their prosecution to a successful issue hangs the extent of our prestige. And

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[1] "The First World War," Vol. II., Colonel Repington.
[2] "The Conduct of War," von der Goltz.
[3] "On War," von Clausewitz.

though the prosecution of such wars may be expensive to the British Empire, ruling as it does many Oriental States, loss of prestige is even more important than loss of money.

Since the beginning of time the cost of war has shown a continual tendency to increase; since the late war, unrest has become more general, commitments have increased, and the financial resources of the nation have been severely strained. Thus, unless some more economical, but equally efficient method of conducting them is found, these small wars are likely to throw an almost intolerable burden on the shoulders of the British taxpayer.

Surely the moral effect of aircraft on the savage mind supplies the means of achieving economy without loss of efficiency on the land frontiers of the Empire. Aircraft possess several advantages over hitherto accepted methods of imposing England's will on her tribal enemies. These are—

(i) Ease and rapidity of concentration for the operation in hand.
(ii) Speed and radius of action. Most important in the large areas where such operations are normally conducted.
(iii) Ability to strike a heavy blow at unexpected points, without the inevitable warning given by the slower movements of ground troops.
(iv) Absence of communications.
(v) Presents a weapon against which the tribesmen have no redress.
(vi) Exposes the enemy's homeland to consistent attack; no matter how many fighting men he puts in the field he is powerless to protect his villages, his cattle, and his corn.

At the same time, the employment of aircraft in this type of warfare makes certain demands which must be complied with; these are—

(i) That an adequate number of aircraft are employed for the purpose in view.
(ii) That the attack is pursued vigorously and without cessation until the object for which it has been undertaken is achieved.

In many cases it will also be essential that the air force should be accompanied by a small ground force, not only to protect the aircraft base, but also to undertake certain operations which may be outside the scope of aircraft.

21.—*Operations in which Aircraft were used as the primary Arm.*

Even in the short time which has elapsed since the cessation of the late war, several examples of the use of aircraft as the primary arm against savage enemies present themselves. These may be summarised as follows :—

Somaliland Campaign, 1920.

In January, 1920, a single flight of aircraft, supplemented by local forces only, defeated the Mad Mullah and drove him in flight across the

Abyssinian border in a campaign lasting twenty-three days, and at a total cost of only £80,000.

Expedition against the Garjak Neuers, 1920.

In March and April, 1920, four aircraft subdued the Garjak Neuers after other forces had failed to do so in the previous campaigning season; the cost of aircraft action was £5,000.

Afghan Campaign, 1919.

On the 24th May, 1919, the Afghan capital was bombed by a single aeroplane. Referring to this matter in his despatch covering the operations, the C.-in-C., India, stated: "There is little doubt that this raid was an important factor in producing a desire for peace at the headquarters of the Afghan Government."[1]

Release of Colonel Jacobs's Mission, 1919.

In November, 1919, Colonel Jacobs's mission was interned by Arabs at Baji, near Aden. A few small bombs dropped by one single-seater aeroplane persuaded the Arabs to release the mission. The strength of the military force proposed for the same object, namely, the release of the mission, was estimated at one mixed brigade.

These are the type of expeditions in which England has been almost continually involved during the past six decades, at considerable expenditure in time, money, and men. Looking back on them, it can now be seen that very many of these expeditions would have presented scope for the employment of aircraft in order to secure economy in time, money, and men. The Ashanti Campaign, 1873–74, the objective of which was the destruction of Koomassie, is an excellent example of the type in question.

CONCLUSION.

Like every new weapon of war, the aeroplane finds on one side ardent supporters, who in their enthusiasm are liable to exaggerate its potentialities regardless of its limitations, and on the other side it finds antagonists who see in it a weapon of very restricted power. It should be our object to investigate both sides of the question dispassionately, and, by so doing, find the happy medium which will define the influence of aircraft on modern war; our policy should then be moulded accordingly.

[1] *London Gazette*, 12th March, 1920.

PAST EVENTS AND FUTURE POSSIBILITIES.

By MAJOR O. W. WHITE, D.S.O., Dorset Regiment.

INTRODUCTION.

"Impressions produced by actual experiences are more vivid and lasting than those resulting from study. But as the scope of experience, however wide and vivid, is strictly limited, the tendency to attach undue importance to these experiences must be guarded against.—F.S.R. II.—1920.

IT is to avoid the bias consequent on personal experience that the operations which form the subject of this slight study of future possibilities are not taken from the European War.

The war is still too near and memories of actual experiences too vivid, also the alterations and improvements in arms and armament which are considered in this paper grew up during the war, and opinions were formed during this transition period which sometimes make it hard to appreciate fully the final results.

For example, the officer or man who only served on the Western Front from after the retreat from Mons has had little opportunity of appreciating the uses of cavalry or cyclists. Similarly, another whose experience of tanks is limited to the summer of 1917 in front of Ypres will have a limited view of the powers of the tank.

Further, it is necessary for a satisfactory consideration of future possibilities to study a war of movement and not permit oneself to be affected by the abnormal considerations of a war of positions and the conditions in the theatre of war resulting therefrom.

For these reasons the operations of the Japanese IInd Army from end of May to 15th June, 1904, have been selected for study.

The period is also of interest as affording an example of co-operation between Navy and Army, and the terrain is of sufficiently varying character to afford comparisons. Only sufficient narrative of the actual operations is given to enable each situation to be reviewed in the light of future possibilities, the object being not to attempt to lay down in any way what ought to be done, but rather to bring out the more probable possibilities in each situation, and how they can be taken advantage of.

The assumptions required for the consideration of the possibilities are :—

Each of the opposing would have attached :—

(*a*) An adequate Air Service to carry out the tactical reconnaissances. No reference is made to long distance reconnaissances as this is the duty of G.H.Q. flights.

(*b*) *Tanks.*—With the Japanese—one group of three Brigades of fast-moving tanks. With the Russians—one Brigade of similar tanks.

These fast-moving tanks would at least be equal to and, it is considered a justifiable assumption, superior to the present day "Medium C" tank.

Such improvements would be slightly increased range of action on one refill—*i.e.*, 80 or 90 miles, with a cross-country speed of 6–7 miles per hour. Such tanks should be armed with a light gun capable of dealing with hostile tanks, in addition to two Hotchkiss or similar weapons.

(*c*) *Armoured Cars.*—With the Japanese—one group of three companies of cars. With the Russians—a similar group.

(*d*) Field and Horse Artillery on both sides "mechanical," not horse drawn.

(*e*) The Infantry Divisions armed comparably to our divisions at the end of the late war.

(*f*) Mechanical transport with the administrative services and of a type suitable to the country.

Such transport, even at the present moment, could be supplied from vehicles of the light box car or tender type. The experience gained in operations in unsettled and unorganised countries (*e.g.*, operations in East Africa and the Dunster Force in Persia) have shown what extraordinary difficulties a light vehicle can overcome even in bad weather. Then, again, improvements are daily being made in the evolution of the "track or pedrail vehicle." Final improvements will probably follow these lines, and a suggested organisation has been gone into in detail in a paper on transport for the administrative services published in the JOURNAL of February, 1921.

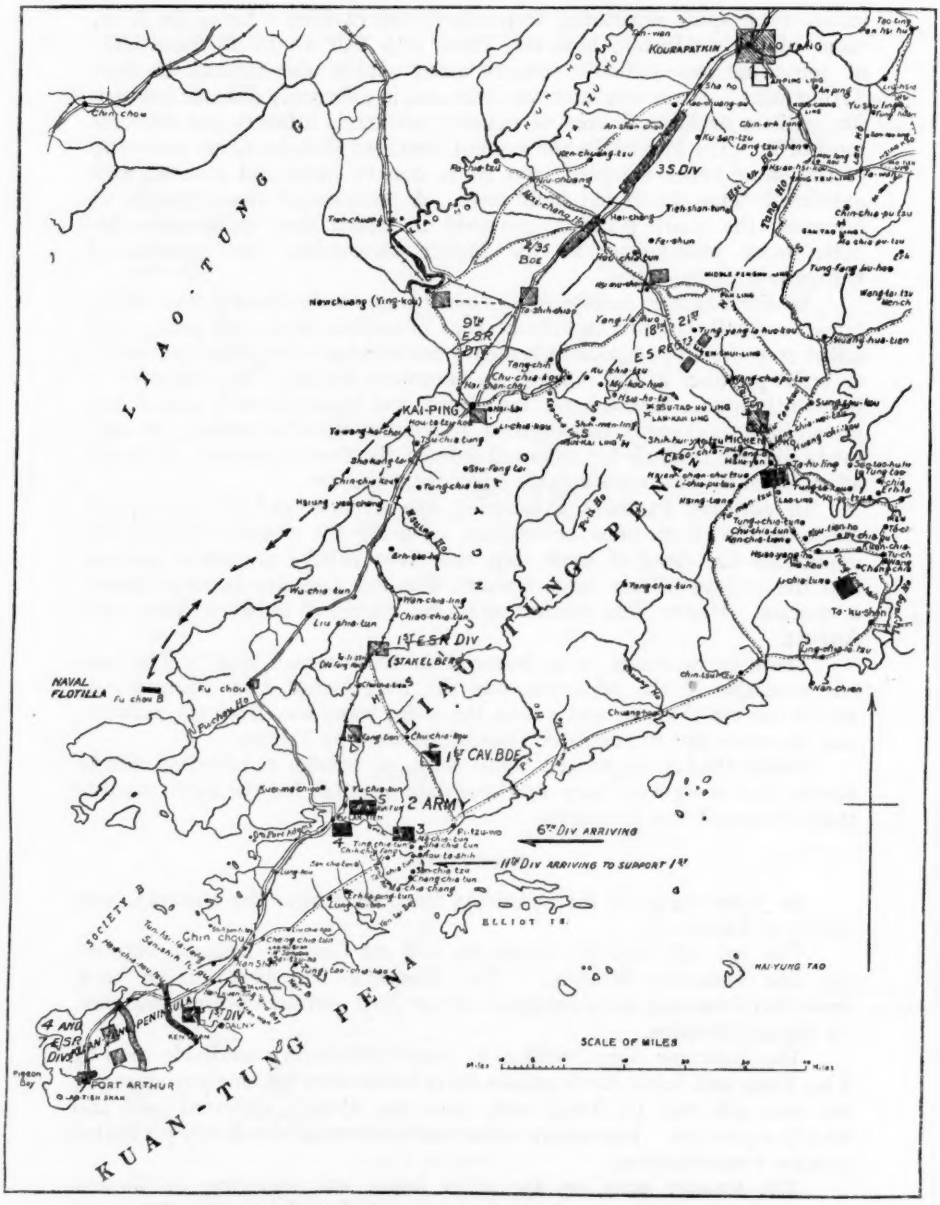
It must, however, be noticed that, although the mechanical and other improvements have been assumed to be equal, their handling is taken as only of the same standard as was shown in the actual operations with the weapons then available.

The pre-war tactical and other lessons taught by the operations are not touched on except where they affect future possibilities.

PHYSICAL CHARACTERISTICS OF THE THEATRE OF OPERATIONS.

When studying any operations it is of the first importance to realise the physical characteristics of the theatre of war.

The Liao Tung Peninsula, in which the 2nd Army was operating at this period, lies between the Liao Tung Gulf and the Korean Bay, and is the S.W. extremity of Manchuria. As a whole, Southern Manchuria is a hilly country with two pronounced ranges, of which one, the Hsiung Yao Shan, runs down the Liao Tung Peninsula. In places the hills rise to nearly 4,000 ft., their precipitous slopes densely wooded with



Situation as affecting 2nd Army immediately prior to the advance.

innumerable spurs separating deep valleys and ravines. Along the N.W. coast of the peninsula, however, there is a belt 10 to 15 miles wide of somewhat less difficult country along which the railway to Port Arthur runs. Even this, however, was and is extremely difficult country for artillery or large bodies of cavalry, although infantry can traverse most of it. The lower hills throughout Southern Manchuria are generally of the same type—rounded, 300 ft. to 800 ft. high, and covered with extremely dense shrub and small trees. A pronounced characteristic is, however, the sharp peak or pyramid in which they culminate—this being more pronounced in the higher mountains, but maintained throughout in the spurs.

As regards the valleys and country generally, every flat space, however small, is cultivated with crops of millet, beans and peas. The millet crop should be especially remembered when studying any operations, as by September it has reached an enormous height. By August it is frequently higher than a horseman's head, and being carefully and closely grown in rows is easily transformed by bending down at about 3 ft. high into a difficult obstacle for mounted or even dismounted troops. It would afford even in June considerable cover from the air.

In addition to these difficulties, the climate and its consequent effect on the rivers must be realised. During the summer months the mountains are clear of snow, but the river valleys are often flooded, and the valleys of any large streams like the Liao Ho become almost a morass. Heavy rain storms may be expected between June and August.

There are no roads as understood in the "Great War." The best one available in the peninsula was the Port Arthur–Liao Yang Road, which ran *viâ* Fuchou, and was at this point some way from the railway, and therefore not in the direct line of advance to Telissu.

Being thickly populated there were, of course, numberless village tracks, but these were very bad and only suitable for the light country traffic in small rough vehicles.

Situation.

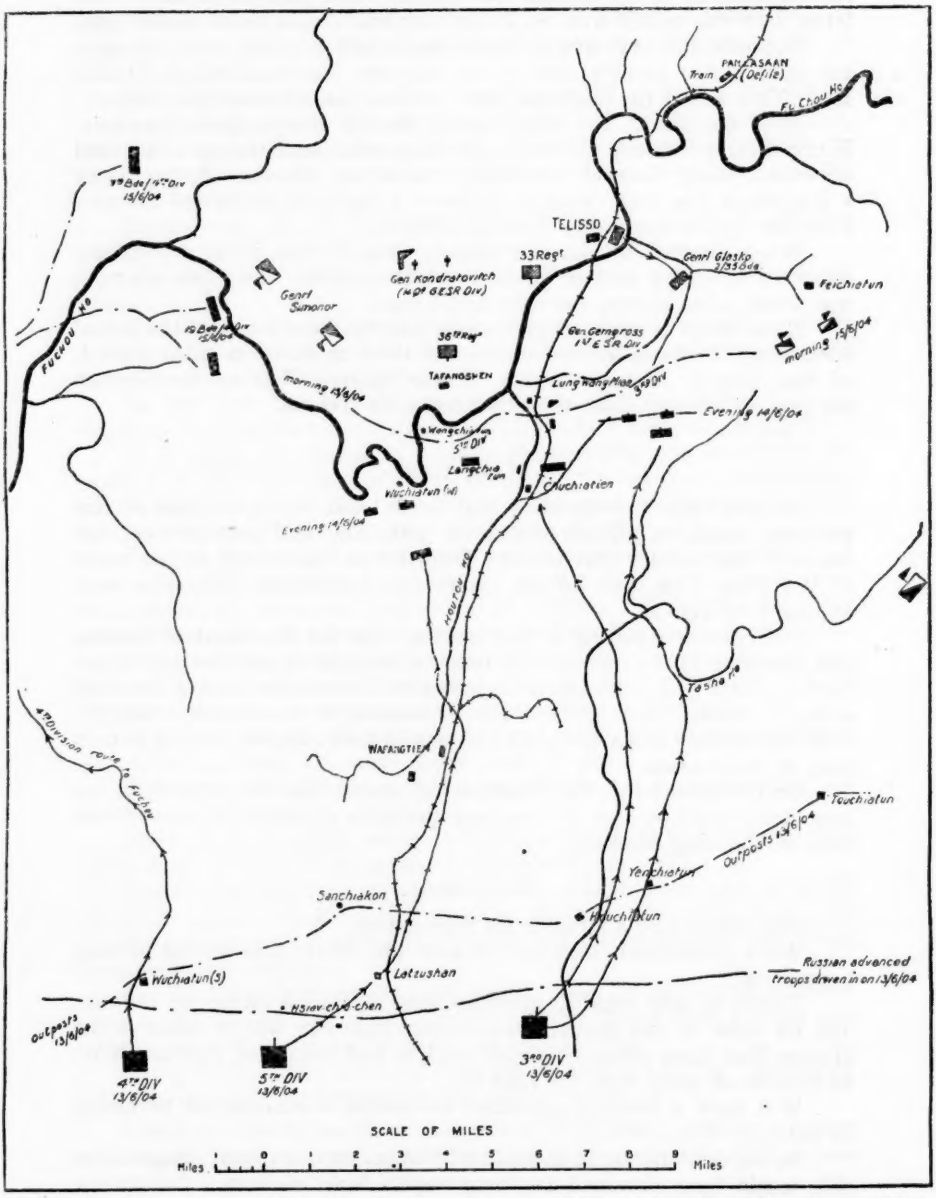
In June, 1904, as far as affects the 2nd Army, the situation was briefly as follows :—

The 3rd, 4th and 5th Divisions and 1st Cavalry Brigade were on the line Pulantien–Pitzuwo. The Russians had been driven back from Nanshan and were enclosed in the Port Arthur enceinte watched by the 1st Division.

The Japanese objective was to concentrate every available man at Liao Yang and defeat the Russians there before they became any stronger, the 2nd, 4th and 1st Army each operating along a different road and widely separated. The nature of the communications absolutely prevented greater concentration.

The Russian plan, on the other hand, was wavering, as General Kuropatkin wanted to wait reinforcements before fighting, and Admiral

TELISSU.—OPERATIONS 13TH–15TH JUNE, 1904.



Note.—The whole country is hilly. The stream valleys are thickly cultivated and densely populated

Alexief insisted on the necessity of speedy relief of Port Arthur. This latter view was upheld from St. Petersburg, and orders issued accordingly.

Opposite the 2nd Army the Russians had a mixed force of some 100 guns, 3,000 cavalry, and 30,000 infantry scattered widely, at Kia Ping, Yinkou and the neighbourhood, with advanced cavalry at Telissu.

After discussion, and being unduly fearful of operations elsewhere, Kuropatkin eventually allowed Stakelberg additional troops. The final allotment being General Stakelberg's own 1st Siberian Army Corps, a Brigade of the 35th Infantry Division, a regiment of the 3rd Siberian Division, and a composite Cavalry Brigade.

When allotted to him the Cavalry Brigade was already marching south to reoccupy certain portions of the railway line. Its strength was about 1,600 sabres, 100 rifles and 6 guns.

No attempt is made to give more than the bare bones of the actual operations. Anyone interested can find them in detail in either Part I. of the Official History of the Russo-Japanese War or the German account of Wafang Koo, the other name for Telissu.

Narrative.

General Oku, Commanding 2nd Army, had heard rumours of this proposed southern offensive, and on 30th May had sent forward the whole of the cavalry (1st Cavalry Brigade) to reconnoitre to the north of Wa Fang Tien, and on the afternoon of this day both sides were approaching Telissu.

The combat resulting in this meeting was the first fight at Telissu, and opposing forces remained in touch with daily skirmishes and minor combats until 3rd June, when the Japanese Commander, having obtained sufficient information, ordered the withdrawal of the Cavalry Brigade, with the infantry and artillery he had sent to their support, leaving patrols only in observation.

On the other hand, the Russians had learnt from the presence of the supporting artillery that it was very probable stronger Japanese forces were in the neighbourhood.

Discussion.

This was purely a struggle for information.

What possibilities does the present and future hold for us in such a situation?

Telissu is only roughly 30 miles from Pulantien along the railway, and for most of this distance the railway runs one side or other of the Hsiung Yao Shan ridge—the main road, as had been said, running N.W. to Fuchou or away from the railway.

Will such a cavalry operation in similar conditions be necessary or not?

As regards the air it is unlikely that at such an early stage either side would have obtained anything approaching mastery.

It would have been the *rôle* of low-flying aircraft to obtain the tactical information required, and for the flights of the higher command to reconnoitre the rail movements and concentrations, perhaps as far as Liao Yang itself.

Now, in country such as has been described, provided the hostile troops took full advantage of the cover afforded by villages, crops, woods, and the slope of the ground, it would appear practically impossible for the most careful and daring low fliers to obtain anything but the vaguest information.

Land troops, therefore, as indicated in F.S.R. II., would be essential, and the rule of " Fight to learn " applies.

This being so, what possibilities do the tank and armoured car offer?

The distance to and from Telissu is well within the radius of the modern tank as described above, or armoured car, in a day, even allowing for skirmishes with the hostile screen.

In this case the Japanese desired information as to whether the Russians were on the move forward and, if so, how near they had got.

It is suggested, therefore, always remembering the nature of the country, and that as it was necessary to support the cavalry reconnaissance with infantry and guns, that the future solution of such problem will be by the despatch of force composed somewhat as below.

On the Fuchou road, a company of armoured cars supported by two companies of infantry and Stokes' mortar battery on lorries, and two sections of mechanically-drawn field artillery. The latter to afford protection should the reconnaissance meet fast moving tanks or with guns.

For the main reconnaissance on Telissu, where the tracks are unfavourable for cars: one battalion of tanks supported and assisted by two regiments of cavalry and a battery of horse artillery.

It may be argued, use either cavalry or tanks, but do not mix them, especially as a tank will move faster than cavalry.

It is submitted, however, that in such a theatre a combination will produce the best results.

Much of the country, owing to woods on the hills and the wet close cultivation of the valleys, would be impassable to tanks.

Lorries carrying infantry would not be able to move fast, if at all, along the tracks, and the result would be that the tank without support would have a limited zone of activity, and be liable to surprise and defeat from anti-tank defences.

On the other hand cavalry alone might easily be held up by machine guns in the villages and at the crossings of the numberless nullahs and streams, even if hostile tanks were not encountered.

Going further into detail, it is suggested that a suitable disposition for such reconnoitring force along the railway would be :—

Cavalry.—One regiment on each side of the railway, forming a screen covering the front required, with due proportion (one-and-a-half to two squadrons) kept in hand to fight.

Artillery.—Moving with the main body of the tanks in vicinity of the railway.

Tanks.—Headquarters, Wireless Section, and two companies along the railway or its vicinity. One company on the right supporting the cavalry on their flank—a wireless tank to accompany this section. The left flank is to a certain extent covered by the force on the Fuchou road, with which it would be in wireless touch.

There is another solution, however, of this first problem which is perhaps worthy of consideration—always remembering the characteristics of the theatre.

If an enemy is kept continually under observation he cannot carry out a surprise. Hence the ideal outpost is one where the enemy is picquetted and consequently always under observation. The new tanks and armoured cars appear to offer facilities for this.

It is suggested that where, as in this case, the front is restricted, the possible lines of advance for large bodies limited, and the natural obstacles considerable, the Commander would be justified in using a very large proportion of his tanks and armoured cars in a far distant line of observation, especially as he could be constantly in touch with it by wireless.

If this argument is accepted it is suggested that under conditions of the near future, the 2nd Japanese Army would have had an outpost line of armoured cars and tanks extending from the Pili-Ho, east of Telissu, thence to Telissu, and so down the Fuchou Ho, stiffened at particularly dangerous points by infantry and guns.

It must not be forgotten also that with M.T. large bodies of infantry can be moved rapidly, and that tanks can easily drive in an ordinary outpost line. It seems, therefore, that, as the second duty of the outpost line is to delay the enemy long enough to enable the main body to get into its position to fight, and that whereas the time required for the occupation of a battle position cannot be materially reduced, the outpost to fulfil their duty must either be placed farther away or on the line of some natural feature which affords an efficient obstacle to tanks and mechanically transported infantry.

It may be urged that tanks are not much use at night, and owing to increased air observations, surprise attacks will be more and more carried out under the cover of darkness. In such cases, however, the outpost tanks will have been able to reconnoitre and possibly mark their particular area, and so distinctly have the advantage of any attackers.

Lastly, the only effective mobile weapon against tanks are tanks and guns, so it appears that for adequate protection in future the outpost line must be strongly supported by these weapons, even if the argument as to distance is not accepted.

NARRATIVE—*continued.*

As a result of certain orders and information, the G.O.C. 2nd Army was free from the 4th June to prevent General Stakelberg's advance, and, in fact, to advance himself in accordance with the general scheme.

At this time his force consisted of three divisions and a Naval contingent of 1,500 all ranks, and six field guns. The advance was delayed owing to the trains not yet having been disembarked.

The Russians under-estimated this force in the most extraordinary way, and General Stakelberg received orders on the 7th June to advance and capture Nan-Shan. This order was made more difficult of accomplishment by the Commander-in-Chief refusing to allow General Stakelberg to concentrate what forces he had.

It is obvious, of course, that with modern facilities of observation this false appreciation could hardly have been made by the Russians. The Japanese, on the narrow Pulantien-Pitzuwo position, must have disclosed their considerable strength to the air.

Directly the Japanese G.H.Q. realised the Russians were committed to this advance all the other armies were ordered to carry out active operations with the object, which was successful, of weakening the Russian effort.

The Navy also co-operated in bombarding the coast as far north as Kai Ping, and obtained information as to the Russian movements.

On the 7th the Russians had their outposts on the line Ma-Chuantzu–Hsiao–Chia–Chen–Chi Chiatun, with also independent posts further out. This is about a 30-mile front, and watched all the Japanese approaches. The reasoning as to use of cars and tanks in distant observation line applies also to this situation.

Between the 9th and the 11th cavalry reconnaissances obtained accurate information as to the extent and nature of the Russian force, and that in certain places the outposts were strengthened by infantry. On the other hand the Russian information was indifferent, and thus although the withdrawal of Japanese ships relieved one anxiety it was not till the 12th that General Stakelberg was permitted to concentrate his command.

The comments on the previous reconnaissance applies to those operations also. Either side, making full use of and properly handling tanks available under modern conditions, could have driven in the opposing outposts and obtained still better information.

General Stakelberg still under-estimated the numbers against him.

On the 12th of June General Oku's trains had arrived, and on the 13th his advance had begun.

On that date, moving in three divisional columns, the 2nd Army reached the line Tai Ping Chuang, Kuan Chiatun, Wuchia Tun(s), and at 7 p.m. orders were issued for the advance next day.

The lines of advance are given on the maps; the instruction was to drive back the enemy with the 3rd and 5th Divisions, while the 4th moved *viâ* Fuchou to operate against the enemy's right and guard against any advance along the main road.

General Stakelberg, on the other hand, had given up the offensive, and decided to await the Japanese in a position he had selected south of Telissu.

He again incorrectly appreciated the position and disposed his troops so that he had a whole division and four batteries to the east, and a weak brigade, two batteries and the bulk of his cavalry to the west of the railway, whereas the Japanese had two divisions to the west and one division and a cavalry brigade to the east. Three regiments of infantry were still on the train coming up to the Russians.

On the 14th the Japanese moved as ordered. Dispositions and moves are shown on the map.

On this morning General Oku, Commanding the 2nd Army, heard that the 6th Division had disembarked some troops, and he ordered them on to Latzu Shan at once. By 2 p.m. the 3rd and 5th Divisions had pushed in all the enemy's advanced troops and a heavy artillery duel started; under cover of this the Russian position from Ta Fang Shen to Lung Wang Miao was reconnoitred. At 3 p.m. the duel was at its height, but, although the Russians had disclosed thereby the whole of their artillery, the Japanese 3rd Divisional Artillery only had come into action.

About this time the right of the Japanese attacked without success the Russians about Wa Fang Wopu; the latter were reinforced and the attack was repulsed. General Stakelberg received a verbal report of this about 3 p.m. on visiting this area.

No important success was gained, and at sunset the 3rd and 5th Divisions held a line running from Ssu Chia-Cho through Lung Chia Tow to Wuchia Tun. Headquarters 2nd Army moved to Wa Fang Tien, reaching there about 3.30 p.m. The Cavalry Brigade on the extreme right did nothing during the day. On the left the 4th Division reached the position assigned to it, a detachment clearing a company of Russians out of the town of Fu Chou during the day.

Meanwhile General Stakelberg, with a quite incorrect appreciation of the situation in his head, returned to Telissu and moved his reserve out to his left with orders to come under General Glasko's control.

This erroneous appreciation could not have been formed if modern facilities of air observation were available. Although no reports of engagements west of the railway had been received, low-flying aeroplanes would surely have located the 5th Division, and perhaps the 4th Division also.

However, General Stakelberg decided on a counterstroke on the 15th, and as a result of his movements had three-quarters of his force east of the railway, and his only available reserves were still coming up by train.

General Oku, on the other hand, decided the enemy were weaker than his force, although being constantly reinforced by rail. Orders were therefore sent out at 11 p.m. for further attack on the morrow. The moves consequent are indicated on the map.

General Oku also reduced his reserves to two regiments by returning one regiment to the 5th Division. The leading troops of the 6th Division, however, might be shortly expected. His plan was to attack the left

and centre of the Russians with the 3rd Division and turn their flank with the 5th and part of the 4th Divisions. The cavalry were to operate on the right flank.

It is necessary here to consider the topography of the battle field.

In front of the 2nd Army position lies a line of hills rising 600 ft. to 1,000 ft. above the valleys, blocking the view beyond and about 2,000 yards north of it lay the main Russian position. The range of hills lies like a screen before the position, and almost entirely hides all movements behind it. The railway, road and Hou Tou river pass through a gap in this line of hills, the boundaries of the gap rising in two bare steep peaks. The gap extends for about half a mile, and of the same length, narrowing in the centre to about a quarter of a mile. The hills on either side are inaccessible to field artillery. To the west and at the extremity of the range is another and larger gap through which the Fuchou Ho runs. Directly behind the railway gap and covering it runs out the Lung Wang Miao spur, and between the two are villages surrounded by large trees. This spur was the main artillery position of the Russians. North-eastward from the eastern boundary peak of the railway gap, the position follows a curve of commanding points to Fei Chia Tun. Here were trenches and gun pits. The valley of the Fu Chou Ho is flat, open and heavily cultivated, and very gradually narrows to Telissu. In this valley connecting the right and Lung Wang Miao were infantry trenches and gun pits, while the main line on the right ran along a well defined feature N. of N.W. of Ta Fang Shen.

From west to east the position measured about eight and a half miles.

A heavy mist at dawn in the Hou Tou and Fuchou valleys enabled the Japanese infantry, who had started at midnight, to get to the Russian position.

At 5.25 a.m. the weather cleared and the artillery opened.

During the night the Russians had made some alteration in their tactical dispositions and were ready to attack on their extreme left. Orders, however, for the attack were late, and considerable misunderstandings arose owing to some vagueness in their expression, the result being the attack by General Glasko, which was to have started between 1 and 2 a.m., had not started at dawn. More delay occurred after the Japanese artillery opened, for the matter was still being discussed by the Commanders concerned. When eventually orders were issued to advance, a vague order was received from General Stakelberg giving instructions for a withdrawal if the Japanese advanced, or for a halt if they retired.

General Gerngross, however, had advanced between 7 and 8 a.m., and progressed slowly, and pinned the Japanese to the rough trenches they had thrown up at night.

The 5th Division, while this action was in progress, had got on well, and when it was realised that the 3rd Division were being attacked, the advance was pushed with even more vigour, with the result that

by 10 a.m. Tafang Shen and the heights above it had been definitely captured.

As a result of this, artillery fire was concentrated on the Lung Wang Miao position and the Russian artillery silenced and knocked out. The 4th Division troops were now beginning to come into action and had got touch with the 5th Division near Yang Chia Tun at 9 a.m.

General Stakelberg's efforts, on hearing of the situation, to reinforce this flank were quite unavailing. His communications were, of course, bad, but there were unnecessary delays and other faults. At 11.30 a general order to retire was given, and about mid-day the retreat on the right began.

Meanwhile the attack on the 3rd Division had no success though pressed home, and shortly after 10 a.m. the right of General Gerngross's force came under flanking fire from the 5th Division. As a result about noon orders were given for a withdrawal on this sector also.

The 3rd Division resumed the offensive and, securing the railway gap, the artillery advanced and occupied the Lung Wang Miao spur and so commanded the valley to the north.

About 2 p.m., two battalions of Russian infantry arrived by train and detraining at a siding were of marked assistance in checking the Japanese turning movement. Added to this a heavy rainstorm came on at 3 p.m. which effectively blinded the Japanese artillery and materially assisted the Russians to get away.

The Japanese did not follow up their victory, ammunition was running short, and the ground near and beyond Telissu was unsuited for cavalry action. Two squadrons only were sent north and behind them outposts were established. Thus the attempt to relieve Port Arthur was a signal failure.

Consideration of Possibilities.

Now accepting the general plan adopted by each leader it is for consideration what use could have been made of the air and mechanical weapons. As regards the air service much comment is not required, except a prepared position should generally be obvious in the photographs taken, although in a scrub-covered country a well trained army would doubtless be very hard to locate from the air.

On the other hand to attack requires movement, and troops on the move, even in such difficult country, are far more likely to be spotted. As regards actual attacks from the air, attackers would be likely to suffer more severely than the defenders in this country, but once the retreat commenced great damage could be done to the retiring troops forced to pass through the defiles north of Telissu.

Turning to the *rôle* of the tanks and armoured car units, the possibilities are not so easy to explore.

A detailed study of a map (large scale) brings out the fact that behind the right and N.W. of Telissu there is a cluster of steep hills, and that the

whole of the country along and immediately behind the Russian left is similarly rugged.

The Japanese cavalry also were unable to pursue, although it is extremely probable a cavalry force similar to the Desert Mounted Corps in Palestine would have got further.

Leaving the ground out of consideration for the moment, it is for decision whether the tanks available can be more profitably used to co-operate with the infantry on the divisional fronts, or acting independently to break the enemy's line at some point and so facilitate the advance elsewhere, or lastly to be saved to exploit success and complete the destruction of the enemy.

The tank being essentially an offensive weapon, it may be anticipated that the defenders' tanks will be used entirely for a counter-attack, or to engage the tanks attacking with the infantry.

In a battle like this, still without considering topography, no continuous defensive lines will be met, and the defence will consist of a series of defended localities. It would appear better, therefore, provided no exceptional preparation has been made, to use as few as possible of the tank units with the infantry, and even these as a reserve of power to overcome unforeseen difficulties and to keep the bulk to rush forward and immediately exploit success. To do this their location in the battle area will have to be most carefully selected.

The immediate exploitation of success is always difficult even with the best arrangements, but the mobility and fire power of the tank should render it peculiarly effective for this purpose. The minutes of wonderful possibility just after a successful assault fly only too quickly, and at such a time a rapid advance by tanks should reap enormous benefits. They cannot, of course, be left entirely by themselves, but should be followed and accompanied by any other troops on foot or horse that are available. It is very easy for a tank to capture, but very hard for it to hold or maintain an advantage won.

Now, turning to the actual ground and applying the above arguments. It will be seen that centre and left only offer possibilities for the best use of tanks.

It is suggested, therefore, the allocation should be somewhat as follows :—

Attached to the 3rd Division.—Two companies to assist the infantry in dealing with defended villages.

With the 5th Division.—One battalion, their *rôle* being to exploit success in the centre and along the valley. One company of this battalion might be attached to the infantry to assist in the capture of defended villages, the primary *rôle*, however, being to rush forward and over the defences immediately after the assault.

In Army Reserve.—A Brigade less the two companies with the 3rd Division and the battalion with the 5th Division.

With the 4th Division.—Here some difference with the plan adopted for the actual battle is suggested.

About 20 miles north of Telissu and 30 miles from Fuchou the main Port Arthur–Liao Yang road meets the railway along which, in the event of defeat, the Russians would retire.

It is suggested that only one brigade of infantry and a proportion of 4th Division artillery would be ordered to support and co-operate with the 5th Division against the Russian right. The remainder of the Division should be held ready with the necessary M.T. to "embus" directly the battle was won. With them would be two brigades of tanks and two armoured car companies. The *rôle* of this force would be to head off the retreating army at the junction of road and railway and hold them until the main body, following up their success, would arrive. Special precautions by air will be necessary to protect this operation and ensure surprise.

If successful this would ensure the capture or destruction of the whole enemy force, and even if only partially so would drive them off the road into the hilly country to the east.

Or if it arrived too late at the junction, it would still be in position to continue a close and merciless pursuit.

The remaining armoured car company would remain in G.H.Q. Reserve to be attached to the cavalry operating on the right flank if the tracks were found passable.

The 4th Division Commander in allotting his troops would, of course, take special care to ensure that the tanks always had an adequate reserve, so that the crews could be rested without having to break off the fight once touch was gained.

In open warfare it will always be difficult to foresee for certain what localities are most likely to hold up the infantry ; considering the handling of the tanks with the 3rd Division in more detail, it is therefore suggested that no definite allotment of frontage within the Division should be given.

The advance guard might be allotted two sections to move by bounds between the van and main guard and operate outwards when the protecting troops have been driven in, to assist in locating and fixing the enemy's flanks.

The remainder of the tanks, *i.e.*, two companies less two sections, should be kept under control of the Divisional Commander, to be utilised as and when it was seen definitely that any locality was holding up the advance.

With the 5th Division the possibilities are more definite, certain villages and localities will obviously be organised as strong points, and it is desirable to make certain of breaking through rapidly.

It is suggested, therefore, that one company should be definitely allotted the *rôle* of leading the infantry on through the villages—one section detailed to assist in the capture of the hill to the west of the railway gap as far as it is scaleable on its western side, and the remainder, moving by bounds, follow up so as to be able to immediately exploit the success

gained. A proportion of tank bridges would have to be carried by this party to prevent delay once the valley was reached and irrigation channels met.

There are numberless other points worthy of consideration. No two military situations are the same, but no improvement in armaments or weapons has ever altered the fundamental principles of war, and there are few more fascinating studies than that of the history of a past campaign in the light of recent or personal experience and envisaging future possibilities.

REFLECTIONS ON SIR JULIAN CORBETT'S OFFICIAL HISTORY.

By ARCHIBALD COLBECK.

SIR JULIAN CORBETT'S official history of naval operations may be compared with the summing up of a judge at the end of a great trial. It has the same impartiality, the same clearness, the same restraint and dignity, and, just as a summing up, without taking sides, does persuade a jury to draw the proper deductions from the case before them, so Sir Julian Corbett's narrative, by the manner in which the facts are arranged, by the vigorous, sober style in which they are described, leads the reader to form just conclusions about the conduct of war.

It would be idle to summarize a volume, which describes the progress of the war at sea from December 1914 to June 1915, and contains a full account of how the Dardanelles campaign was planned, and put into execution; of how von Hipper bombarded Scarborough, Whitby and Sunderland, and escaped from our squadrons by " a chance of the sea beyond human calculation "; and of how the battle of the Dogger Bank was fought, for there is no substitute, or short cut, for reading a narrative of such fulness. It must either be studied or left alone.

It would have been thought that no contemporary historian could have added to our knowledge of the Dardanelles campaign; the well-spring of so vast a current of official and private writing; and yet, when Sir Julian Corbett describes that operation, he does so in a manner that is absolutely new, in that he puts the discussions of ministers, and the decisions of departments, into their historical perspective, and, in a few intensely suggestive sentences, connects the campaign with the past. Historical students cannot help regretting that Sir Julian Corbett was bound to deal rather briefly with the historical setting of the Dardanelles operations, to suggest it rather than to discuss it; but it is for this reason that what he has written under this head may be made the basis for further enquiry. It will, however, be as well to set out the most important of such passages before proceeding further: (i) After describing the political and economic issues of the project, Sir Julian Corbett writes: " The case for it was obviously very strong; it followed, moreover, the traditional lines of a system of warfare upon which—whether ideally the best or not—the British Empire had been built up. (ii) After giving full details of the shifting situation on the continent, and of the difficulties in the way of deciding to attack the Dardanelles with a powerful military force, the historian continues: " Although in

the naval view the Russian reverses were an additional reason for pressing hard, and at once, at the Dardanelles, military opinion was too unanimous and too plausible to be resisted. No doubt it was, to some extent, coloured by a constitutional dislike of seeing troops diverted from what current military doctrine taught soldiers to regard as the only decisive theatre," and (iii) after reviewing the chances of war and the items of success and failure that were entered on the score of the belligerent powers in the spring of 1915, Sir Julian Corbett continues: ". . . There were at least three instances in which it had been shown that when a war is sufficiently maritime in character for the sea to become an essential factor secondary theatres may be decisive. It was in the Peninsula we had made our chief contribution to the overthrow of Napoleon; in the Crimea the Russian war had been won; and by the conquest of Havana we had brought the Seven Years' War to its sudden and triumphant conclusion. In all three examples the result was due to the concentration of naval and military force where the enemy was weakest."

These three passages give us a picture of the Dardanelles campaign as it really was; the last experiment in that amphibious strategy to which Great Britain has clung for two centuries; and it is the purpose of this article to examine how far the expedition against Constantinople resembled previous efforts of a similar kind; whether it promised results equivalent to those which flowed from the capture of Havana in 1762, and the Peninsular War, or to those which might have resulted from the Walcheren expedition had it been successfully prosecuted; and to examine, rather more closely than has been done hitherto, how far the criticism that has always been directed against such operations is just; for though " side show " is a new expression in the language of strategy, the attitude of mind that voiced it is more than a century old. Burke's majestic indignation at a strategical plan which directed our naval and military forces against the West India Islands whilst the Revolutionary armies were overpowering Europe, Sheridan's sarcasms about filching sugar islands, and Lord Porchester's attack on a government which had " blown up a sluice, demolished a basin, and destroyed a dock," whilst the Allies of Great Britain were reeling under the blows of Napoleon's armies, are all variants of a line of criticism which has been adopted whenever we have been seriously engaged in a secondary theatre; and, if a modern exponent of what is known as the continental theory of major strategy were to voice his objections to distant expeditions in general, and the Dardanelles and Syrian campaigns in particular, he would do so in these terms. Granted that efforts of that kind may have been worth while in the past, it is absurd to think that a nation maintaining 2,000,000 armed men on an unbroken front will be beaten to its knees except by utter economic exhaustion or an overwhelming defeat of its principal forces.

This line of argument has been much elaborated in technical works on strategy, where it is generally to be found in chapters which treat of unlimited war. Now it is certainly true that war has altered in character

since the eighteenth century; it is begun more reluctantly, and is carried on more ferociously and with greater destruction; but whether the change is one of nature and not of degree, and whether it is so great that it has brought with it a revolution in the laws of strategy, deserves to be closely examined.

I take it that nothing more accurately reflects the nature of a war than the peace which ends it. Now the great peace treaties of the seventeenth and eighteenth centuries, though they vary in their contents, have this in common: they are all founded on a system of barter, in which the gains and losses of each belligerent constitute the goods exchanged. The Peace of Nimeguen recorded loss of territory to Spain; the Peace of Ryswick reversed much of the previous compact by further transfers of provinces, and the Peace of Utrecht, although it ended a war waged for very considerable objects, adhered to the same model. Nor did the Treaties of Paris or Versailles depart from those which had gone before, except in the actual territories ceded or gained. It has generally been thought that the last French war differed essentially from earlier conflicts, and formed a link between the limited wars of the eighteenth century and the unlimited war of modern times; but if we inspect the statement closely, it will be found to apply more to the nature of particular campaigns than to that of the war as a whole. During the course of that protracted struggle Great Britain attempted to negotiate a peace on three occasions. In every instance the basis of negotiation was that a settlement should be made by exchanging conquered territory, and in no case was there any question of those wider objects which are associated with unlimited war; alterations in the government of the beaten country, expulsion of dynasties, vast indemnities, and so on. Even when Napoleonic France was utterly broken, when the British and Spanish armies were sacking and devastating southern France, when the Austrians, the Russians, the Swedes and the Germans were at the gates of Paris, Wellington was quite uncertain whether the Allies would be even so drastic in their terms of peace as to insist on restoring the Bourbon dynasty, and advised the population of southern France not to declare themselves too soon. In a strictly technical sense the war ending in 1815 might be called unlimited; but, in the wider sense of a war, having for its object the reducing of one nation by another to a state of complete submission, the Napoleonic war was unlimited only in its very last stages. In fact, unlimited war would seem to consist less in the numbers engaged, and the greatness of the objects pursued, than in the degree of success obtained; and the greatest novelties of the Napoleonic wars to consist in technical points. I shall return later to this subject when I examine the nature of the great war: for the moment it is enough to point to the danger of hasty generalisations upon the first principles of policy, war and strategy.

If, then, we take it as proved that the main object of war in the past was to gain a position from which we could derive a good bargain in territories and provinces, the power of Great Britain could hardly have

been better employed than in overseas military efforts directed against such of the enemy's possessions as were weakly defended. Those expeditions varied in kind; some were purely for the purpose of conquest, others were the instruments of a larger purpose. The conquest of French Canada and the reduction of Havana were of the first class; the expeditions to Catalonia under Lord Peterborough, to Walcheren under Lord Chatham, to the Peninsula, to Naples in 1805, or to Pomerania under Cathcart are all examples of the second. It is clear, moreover, that expeditions of the first kind—unless the economic consequences of the conquest are very great—will more affect the terms of peace than the progress of a campaign, whilst those in the second category may influence the whole course of a war.

What is it, then, that most recommends a secondary theatre as a means of forwarding the main objects of a campaign? If we base our judgment upon recorded examples rather than upon pure deduction, only one answer is possible; the political effect of success in that theatre, that is, the extent to which the theatre can be used to raise up fresh enemies against the principal opponent. Each one of the instances given supports the statement. The expedition to Catalonia was undertaken in the hope that Lord Peterborough's forces would kindle rebellion in that turbulent province; the combined force landed in Naples in 1805 was intended to serve as a rallying point for a revolt in southern Italy; the Peninsular campaign was begun with a similar political object, but applied to Spain; and although the aim of the Walcheren expedition was to seize Antwerp for a time sufficient to destroy the ships and dockyards, the Parliamentary enquiry in 1810 shows that Lord Castlereagh had hoped that the capture of Antwerp would stir the whole Netherlands.

More than this, achieving the political object of a campaign will often retrieve much military failure. In 1810, Wellington was quite unable to face Massena's invading armies, and was driven back to his defensive positions, on a tongue of Portugal about thirty miles long and fifteen deep, whilst half the Spanish Peninsula was in the possession of the French. But his march through Portugal before the retreat began had roused the flagging spirit of the country to a desperate effort of guerilla war which, in the end, turned the tide. In 1812, the British armies failed to hold the ground won by the battle of Salamanca, and after capturing Madrid, were compelled to abandon it; but the political effects of having occupied the Spanish capital and driven out Napoleon's nominee were far more lasting than the bad results of the setback. Finally, the result of Lord Peterborough's Catalonian expedition upon the war of the Spanish succession as a whole was in exact proportion to the political effects of his campaign, which were in the nature of a partial success. He roused the Catalans in favour of the Austrian dynasty, but the revolt did not spread beyond the province. In the outcome, he certainly created a diversion that was well worth making, but he was not able to strike a resounding blow which would have enabled the Allies to raise their peace terms.

It is now possible to summarize the results of this long preamble, and to state their application to the Dardanelles campaign; they are as follows: What political consequences did success in that theatre promise, and was the war in 1915 so essentially different from any that we have ever carried on before, that the opening up of a secondary theatre was, in itself, an unsound thing? But even after placing such boundary posts round the enquiry, it must be cautiously proceeded with, and the comparison between past and present must not be pressed too far, for, as Sir Julian Corbett now shows, the Dardanelles campaign was conceived in two separate ways: firstly as a rapid diversion, and then as an eccentric attack upon the Central Powers. Under the first aspect it had some resemblance to the Walcheren venture; under the second it was as significant, and as important, an operation as Wellington's first landing in Mondego bay; but, after this, no comparison is possible, for it was the peculiar fortune of the Dardanelles campaign to change its nature and objects not by the decision of any one person, but by a mere current of events which nobody made any effort to control; and of this history affords no previous example.

In its first aspect the hopes and intentions of the expedition were these: that the forts in the narrows would be dominated by the squadron, and the mines swept up; after which an imposing armada of ships and transports would have appeared off Constantinople, and have terrified the Turks with the promise of unparalleled disasters if they continued their resistance. It is now generally thought that the plan was wrong; and the reason given is that ships' guns have never contended successfully with permanent works ashore. But this does not go to the root of the matter, and it is my present purpose to show that the first cause of the disaster was, that the plan, by its very nature, demanded a certain form of execution and received another.

The purely naval attack was in the nature of a *coup de main*. Supposing that owing to bad gunnery, inefficient fortifications, and badly served field artillery, the Turks had allowed our ships to get past the Narrows, it was not to be expected that the landing and demolition parties which would have been scattered along the shores of the straits could have held their ground in the face of a field army in the peninsula, or that the small striking force which would have accompanied the fleet to Constantinople would have sufficed to have kept the whole Turkish nation in subjection, even though they occupied what would have been left of the capital after a naval bombardment. All that could have been hoped was that the Turkish commanders *might* have abandoned the peninsula after the fleet had reduced the forts, and that the government, stunned by the moral shock of seeing a powerful squadron in the Sea of Marmora, *might* have opened negotiations. It was much to suppose such folly in the leaders of a proud and warlike people; but, whether the suppositions were right or wrong, the venture had a character of its own —that of taking a gambler's chance upon the demoralizing effects of a sudden, furious onslaught. Now speed in execution is the one condition

essential to the success of an attempt so desperate, and had it been possible for the fleet to have opened its attack by a lunge against the heart of the Turkish defences, and to have pressed that attack without any relaxation of effort until the issue had been decided, the manner of carrying out the plan would have harmonized so well with its nature, that it might have been worth while to make the attempt. But the only method of attack which expert naval opinion could sanction was the reverse in every particular. Admiral Carden was convinced that the Narrows could not be rushed, but thought that they might be reduced by prolonged bombardment; when, therefore, this plan was adopted, those responsible decided to carry out a *coup de main* by a long-drawn battle; and the wrongness of an attempt to combine such opposites is independent of all questions of naval gunnery.

It is, therefore, a matter for no small wonder, that when Admiral Carden's plan of reducing the forts by prolonged bombardment was submitted to the War Council there was no one present clear minded enough to argue: "We are now told that the straits cannot be rushed; very well, whatever the merits of the alternative plan, it is not what we want. Our project of making a rapid stroke against Constantinople by forces sufficient to reduce it to ashes, but quite unable to meet the Turkish field armies, was desperate but feasible. *In bello multum potest fortuna;* and there is no way of calculating how far the effects of a blow so forceful and dramatic might have confused the Turks, and have awakened their internal dissensions; but to appear before the Turkish capital after a three weeks' struggle is a success of a wholly different kind. The Turkish leaders will have been given time to calculate the chances and effects of a first success and to take all measures necessary for reversing it." In fact, had Admiral Carden's plan succeeded, and had a proportion of the victorious fleet passed into the Sea of Marmora after a protracted bombardment, every army leader in Turkey would have known that they had only to reinforce the field armies in Gallipoli and Asia with men and guns, to man the forts in the Bosphorus with steady, experienced garrisons, and to keep a field army entrenched near the capital, and final success would have been a matter of days.

The second aspect of the campaign dates from the opening of the combined attack, and in this phase, it cannot be denied that the project adjusted itself to the well-worn principles of British strategy. For if, in the past, the expedition against Havana was justified by the economic importance of that centre of Spanish trade, and the peninsular campaign by the momentum of resistance which it raised against Napoleonic France, then, the Dardenelles promised results which would have surpassed all precedent: a revolution in Turkey and the creation of a league of Balkanic states hostile to the Central Powers.

Two writers of unquestionable authority, Mr. Henry Morgenthau and Mr. Lewis Einstein, have each published a careful and temperate account of what they saw, heard and discussed in Constantinople during the war, and they both describe a series of oppressions, deportations,

arrests, executions and massacres of whole sections of the nation, with singular force and vividness. Obviously, no government would act in this way unless it had much to fear, and the persistent, calculated cruelty with which the government in power treated its opponents proves how formidable those opponents might have become. Mr. Morgenthau, at all events, was quite clear in his mind about the position of the Turkish government. "The Enver-Talaat group always feared a revolution which would depose them, as they had thrown out their predecessors." If that was the situation, was it too much to hope that a British victory in Gallipoli would have precipitated a revolution which was always so near, and have thrown the Turks into such confusion that their further participation in the war would have become impossible? There are reasons which support the assumption even more strongly than Mr. Morgenthau's words. Since 1870 defeat in war has practically always been followed by domestic revolution. The Commune followed the Franco-Prussian war; Russia was convulsed with revolution after her defeats in Manchuria; and the anarchy to which she has now fallen is the outcome of the overthrow of her armies in Galicia; Austria decomposed in civil turmoil after the defeat of her armies; and the forcing of the Hindenburg line raised the red flag in the German capital. All these examples were not available in 1915, but, even then, enough existed to make it reasonable to suppose that the Turkish Empire would have succumbed to what now seems the inevitable consequence of being defeated in the field.* Turning to the second political possibility: the creation of a Balkan league, the authors who have already been quoted, added to such facts upon the diplomatic position in 1915 as are known, show that this, too, was possible. The question has often been discussed before, but it has been much obscured by a minute examination of territorial problems. In point of fact the diplomatic campaign which ended with such humiliation to ourselves failed because our diplomats had not the one material with which they could have driven a satisfactory bargain—military successes. We know, from Mr. Lewis Einstein, how slowly the Bulgarian government made up its mind, and how much anxiety its attitude caused the Central Powers before the final decision was made†; and we know, from Sir Julian Corbett's latest volume, that our Government were willing to cede Constantinople to Russia, so long as the war was pushed to a successful conclusion. Under the circumstances it was not over hazardous to forecast that a resounding British victory in Gallipoli, combined with the intervention of the Russian armies, would have rallied the Balkan States to the age-long dream of Russian policy, a Slavonic league. It is possible that armies so divided would not have lent us any very effective assistance, and would have been defeated in detail by the

* There is one notable exception: Spain was untouched by revolution after the American war. No circumstance could better illustrate the respect for authority which that proud and faithful people has displayed in every period of its history.

† "Inside Constantinople," Chapter V.

compact and disciplined legions of the Central Powers. No one success makes victory certain, but if history proves that the importance of a secondary theatre varies in direct proportion to its political significance, then a victory which would have crushed one opponent and created three new allies was well worth striving for.

I now turn to the question still left outstanding: was that victory attainable, and, if achieved, would it in the end have supported the contention that success in a secondary theatre cannot affect the course of unlimited war?

The first is answered by a single reference. If any person is competent to decide what could, or could not, have been done at the Dardanelles, it is Sir Ian Hamilton; and if any person's word and judgment deserve confidence, they are his. The Gallipoli diary holds an isolated position in military literature. Other military leaders have written memoirs, or elaborated rules of tactics and strategy, or commented upon the history of campaigns, but no commander has ever before recorded the beatings of his pulse during the actual progress of great events; and it is just because Sir Ian Hamilton has related all that he felt and hoped and feared when those sensations were strongest, and his sense of reality most keen, that his diary gives a better picture of the military position than a reasoned appreciation, written after the campaign was over. Now the dominating theme of the whole book is that victory was always very near. Sir Ian Hamilton could never have animated his prose with the sense of hope of confidence, which colours page after page, if his judgment had told him that he was attempting the impossible. This conviction of approaching victory never abandoned him; it seems rather to have hardened with failure; and we may therefore take it as proved by evidence that the campaign might have ended in victory, and have been followed by all the consequences of victory.

The second question requires to be dealt with cautiously. If the recent war was, indeed, radically different from those wars in which our traditional strategy has been built up, then it was certainly necessary that we should revise our methods; but was it, in fact, so different? Those who judged the nature of the war from the statements of our ministers, and, later on, from those of the American President, might think with reason, that there was no connection between the aims which we pursued and those which animated us in our earlier struggles, and that, if the objects pursued were different, the means of obtaining them must necessarily be different too. We have only to read Swift's pamphlet on the conduct of the allies in the war of the Spanish Succession, or the speeches of Lord Chatham, William Pitt or Canning, to be impressed with the cautious manner in which the political leaders of those days defined our commitments in war, and to see how easily their declarations could have been succeeded by diplomatic action, when once a trial of strength had made the military position clear. On only one occasion did a responsible statesman advocate unlimited war: when Burke issued

his appeal against the French revolution, and called upon his countrymen to exterminate its animating principles by arms.

In 1914 our ministers certainly spoke in a wholly different strain from their predecessors. Mr. Asquith assured the country that we should not lay down our arms until "the military domination of Prussia was wholly and finally destroyed"; and this ambitious programme, involving an alteration in the government of a foreign state, was taken up, and even enlarged, by the declarations of his colleagues. These gigantic aims, combined with the affection of military men for what they call a "main theatre," gave a peculiar impetus to the perpetually recurring criticism against efforts in a secondary sphere. It seemed absurd to suppose that we should ever overthrow the military domination of Prussia, and establish the rights of small nations on an unassailable foundation, by directing our armies against the Turks.

But the nature of a war is determined as much by the progress of events as the aims pursued, and it is needful to glance at the successive phases of the struggle from which we have emerged to see whether it corresponded throughout to the unlimited character which our ministers assigned to it. That it did so, in the beginning, there can be little doubt. The Germans had no intention but that of crushing their adversaries into complete submission, and the French, against whom the main effort was directed, fully recognised the nature of the challenge. But the first issues of the war were decided at the battle of the Marne, after which the conflict assumed a totally different character. It may, or may not, have been necessary to stimulate public spirit by declaring that our intentions with regard to the military domination of Prussia were unchanged; the task with which we were confronted was to expel the German armies from France and Belgium, or to seize territory of equivalent importance. The objects of the war were, in fact, as limited and definite as they had been in the days of Bolingbroke and Chatham. Our efforts to achieve those objects failed completely, and in 1917 our military power had passed its zenith, while the Central Powers had added to their conquests by overpowering Serbia and Roumania. No thinking person can doubt that but for the American alliance we should have been compelled to negotiate after the final collapse of Russia, or that the resulting treaty of peace would have resembled the Peace of Nimeguen, Ryswick, Utrecht, Paris or Versailles.

In the first months of 1915, therefore, when the Dardanelles campaign was decided on, the war was of a purely territorial kind. It differed in the numbers engaged, and in the technique of attack and defence, from what had gone before; the military problems involved were in no way different from those of the last two centuries. We could only have compelled our enemies to give up their conquests by enormous concessions, or by making much greater gains of territory than we had done up to then, for our colonial acquisitions were insignificant in comparison to the vast territories in the hands of the German armies. The task before us was to reverse, or equalise, the balance of loss and

gain, and we turned to our old expedient of opening up a new theatre in order to achieve our purpose. The theatre chosen promised everything that had most contributed to our successes in the past, and a clear understanding of the methods by which those triumphs had been gained would have made victory certain. It was not there; and if any justification is needed for the serious study of history by naval and military officers, it is to be found in the story of how the Dardanelles campaign was rightly conceived and wrongly executed.

SOME ASPECTS OF THE WORK OF THE ROYAL AIR FORCE WITH THE B.E.F. IN 1918.

By Squadron Leader B. E. Sutton, D.S.O., O.B.E., M.C.

Introductory.

CO-OPERATION between aircraft and the Army may appear at first sight to be a hackneyed subject, but there is a danger that with the passage of time the details of the work may be forgotten. The writer, however, has not had the opportunity to attempt more than a summary, omitting any mention of training or organisation, but even a rapid survey may be useful, especially as very few books or manuals on the subject exist. The work will perhaps be better appreciated both in its limitations and accomplishments if a few of the pioneer flights are brought to mind. It was on the 6th of July, 1908, that Henri Farman won the Deutsch–Archdeacon prize for being the first pilot to remain in the air on an engine-driven heavier-than-air machine for more than 15 minutes. Farman's actual time was 21 minutes.

That does not now seem a very considerable achievement, and 1908 is not very long ago.

In 1908, also, on 13th January, Henri Farman won a prize of £2,000 for the first flight over a circular kilometre. If we look for the beginning of flying from the military point of view, and not merely for the sake of historical research, we need hardly look further back than the occasion when a pilot won £2,000 for being able to turn in the air. I will now pass over ten years and describe very briefly some part of the work which certain units of the Air Force did in 1918.

I. Artillery Observation.

Observation of artillery fire was carried out by the Corps Squadrons, and by special flights placed at the disposal of the Corps Wing Commander for working with long range guns, usually with targets beyond 7,000 yds.

The squadron attached to the corps did practically all the artillery observation work of the sector: two flights were allotted for counter battery work which may be divided into observation of fire on known enemy battery positions, reconnaissance by flash patrols and observation on fleeting opportunity targets. The third flight in the squadron worked mainly with the infantry, but was also responsible for observation for artillery on bombardment, wire cutting and barrage programmes. The first two flights were concerned with the Counter Battery Staff

Officer, the third, as regard artillery observation, with the Brigade Major, Corps Heavy Artillery.

One reason for this division was that it gave the third flight the easiest artillery observation, work over the area they knew, and tasks which would not conflict in the battle with their infantry co-operation. Counter battery work was more difficult, as the pre-arranged targets were harder to see; observers had to find new targets, and pilots had to work further over the line. There was usually a fixed counter battery programme and trench bombardment programme, examples of which are given in the Manual of Co-operation between Aircraft and Artillery. Orders for the next day's work were received between 6 o'clock and 10 o'clock in the evening, and usually superseded the fixed programme. These orders (largely based on the results of the day's shooting, and on the day's air intelligence reports) were received from the Counter Battery Staff Officer and Corps Heavy Artillery through the Squadron Artillery Officer. There was always a certain amount of work to be done in connection with these orders before they could be re-issued to Flight Commanders, and before pilots received their tasks, there was naturally a further delay. The pilots, who were going up on the first flights, say, at 3.30 or 4, had then, apart from any work that might be required on machines, to prepare photographs and maps, to warn their batteries and to warn the central wireless station of time of start and of the batteries with which each was going to work. If, therefore, orders were received late from the corps, the first pilots started with the disadvantage of having had an exceedingly short night. It was a help if corps issued preliminary orders to cover the first three hours of the day. Good communications were essential to success.

During an artillery flight, the machine's signals were taken in by four wireless stations, viz. :—

(*a*) The Squadron.
(*b*) The Battery.
(*c*) The Central Wireless Station.
(*d*) The Corps (H.A. or C.B.S.O.) set.

All four stations were, of course, connected by telephone. During each shoot reports were received by the Squadron Commander of the first signals, progress, last signals, gaps in signals, weather reports, new targets observed, and enemy aircraft reports, and suitable action according to circumstances was taken whilst the reporting machine was still in the air. For instance, on a machine reporting several new enemy batteries active, arrangements could at once be made with the Counter Battery Staff Officer to reinforce the line, and carry out destructive shoots on those batteries. The pilot and observer on landing saw the Squadron Artillery Officer, who was able, in addition to reviewing the report of fall of rounds, to elicit information as to the nature of hostile batteries seen to be active, and to check by photographs the map co-ordinates recorded in the air. Some pilots flash-spotted by pin-pointing on photographs,

but the comparison of the photograph with the map which was necessary for the transmission of the information by wireless was difficult to do in the air.

Perhaps the fact that it is the pilot who observes is worth mentioning. The observer is a machine gunner. It is easier for the pilot who controls the machine to be in positions to see the bursts, and he can, without thought, send his signals when the machine is in the right direction for Morse-sending. Also he cannot watch for enemy aircraft as well as the observer since the wings confine his view and he cannot use his gun as effectively or rapidly. If an artillery officer is to observe in future, he should fly the machine, or else be in a 3-seater. The principal objections to a 3-seater machine are that it would not be easy to land in a small space and in the next war that will be a necessity; that it would be expensive to produce and maintain; and that it would not be so suitable for other branches of air work as a 2-seater.

At the end of the day's work, wireless logs, of which examples are given in the Manual, were checked over by the Squadron Commander and comments made. It was very important to do this thoroughly so as to discover error and ensure uniformity.

As regards the quantity of work done, each Corps Squadron consisted of 18 machines (these were occasionally increased to 24 in a battle) of which four were usually in the air throughout the day on artillery work—the average length of flight being $3\frac{1}{4}$ hours on the line. This used up 20 machine flights during the four months in the year, when the working day was approximately 15 hours duration. There remained 16 machine flights for photography, reconnaissance and reinforcing the artillery machines in the air. That is allowing that each pilot flew twice in the day, that there were no unserviceable machines and no one on leave. [1]But, as a rule, the best was got out of a pilot by requiring only one flight per day from him on four days a week, two flights a day on two days, and resting him on the seventh day. This may seem to allow a pilot plenty of rest and recreation. It does not, however, count his technical work on the ground, nor such flights as engine-tests, nor flights for training new observers, nor time spent in visiting batteries. And as regards the strain of flying, it may be surprising to hear that in a busy time a pilot was very glad to record times of flight of rounds on a stop-watch so that he could get 20-second periods for relaxing his concentration on his targets, that is to say, the stop-watch saved him looking at the target for the first 20 seconds of the time of flight. The squadron strength is detailed above, because in considering the other work done by a Corps Squadron the amount of machine-flights available for such other work must always be borne in mind. Instead of the 16 machine flights referred to above one might have only six or even less.

The Staff must have a clear idea of the normal day's work of every kind of machine, so that they can tell if it will be interrupted by special

[1] This refers to battle periods. In a year the average flying time of a pilot was an hour a day.

orders. If there is an interruption—if, to take an extreme case, the Corps Squadron is expected to bomb at night as well as work by day—they must be sure that the special orders are of sufficient consequence to justify the interruption.

II. Photography.

The main objects for which photographs were taken may be roughly divided into four according to the demanding authorities :—

1. Reconnaissance of enemy defences and batteries. (Corps.)
2. Reconnaissance of railways, dumps, enemy aerodromes and of strategical lines of defence. (G.H.Q. and A.H.Q.)
3. Oblique mapping. (Divisions.)
4. Mapping back areas to test our own camouflage, etc. (Various.)

This division is, of course, arbitrary. All photography was a method of reconnaissance, adopted because it was in certain ways, but not in all ways, more accurate than eyesight; because it assisted the memory of observers, and because it supplied a record which was easily duplicated.

Photographic work increased enormously during the war. Photographs were taken on the Aisne, but those taken in November, 1914, of the village of Neuve Chapelle from 3,000 ft. perhaps first revealed the value of photography. During October, 1918, 23,247 negatives were exposed, and approximately 650,000 prints were issued. In the first eight months of 1918, over 5,000,000 prints were issued in France. Heights varied from 1,000 to 22,000 ft.

Yet photographic work, in spite of this enormous development, was, at the end of the war, difficult in execution for the pilot and observer, was wastefully ordered, and did not succeed in helping the front line troops as much as it should have done.

The trench system in entirety up to 3,000 yds. was photographed every five days, and the counter battery area every 10 days as a matter of routine. This meant continuous photography. In moving warfare, only oblique and wide angle photographs were of use, and these had to be very rapidly delivered to the troops requiring them.

Demands for photographs, including those required for R.A.F. instructional purposes, as training and checking shoots, etc., were collated and co-ordinated by the Branch Intelligence Officer and orders outside his area were sent to Branch Intelligence Officers concerned. The Squadron Commander then arranged for the photographs to be taken. Neither the arrangements nor the actual taking of them were simple.

In a Corps Squadron one might, in one day, have demands for :—

(*a*) Oblique photos.
(*b*) Long-focal-length photos of certain defences.
(*c*) Ordinary reconnaissance photos, perhaps requiring particular care for the purpose of mosaic or stereo-making.
(*d*) Wide angle photos of the counter battery area.

An idea of the machines available for this work has been given above under Artillery Observation, and as no two of these four types of photographs can be taken in a single flight, it will be clear that a nice problem was set to the Squadron Commander in the combination of various tasks.

Further, it was often advisable in the Corps Squadron to despatch the reconnaissance at such a time as it would cross the line with a scout patrol. That added another complication to the day's orders if weather conditions were unsettled.

If, as it often happened, Corps I rang up at 11, when the day was one-third over, and said that a brigade wanted certain trench photos urgently, or the Counter Battery Staff Officer said that O.B. 11 was active and would a photograph be possible to-day, or the Corps said that they were sorry but they had forgotten that the neighbouring Corps asked yesterday for P. 5, 6, 11 and 12—if these things happened, changes of orders were necessary at the expense of other work, or else pilots were used up on missions which forethought would have made unnecessary.

When the photographic machines had got their orders, their opportunity, and had taken the air, the result of the mission was still doubtful. Camera defects, clouds, E.A. pilots' errors spoilt many boxes of plates and made it necessary to arrange a second reconnaisance. A pilot and observer had to be accustomed to work closely together, to be possessed of great powers of concentration, to be thoroughly conversant with the camera, and to have long training in judgment of when and at what intervals to take the photographs. It must be remembered that a photographic machine whose work cannot be hustled, had to remain a long time in the air over the same area, and so was particularly open to disturbances from A.A. and E.A.

The Corps Squadron could normally issue 1,000 prints a day, and did generally despatch them, though they were not responsible for doing so. Delay in photographs reaching units during stationary warfare was often due to the staff over-ordering, becoming congested with photographs, and waiting till they had studied the first before sending on to units those last taken. Over-ordering, besides delaying photographs, meant a lot of unnecessary work for machines and consequent postponement or neglect of other work.

III. Reconnaissance.

Reconnaissance work has been, to a certain extent, described under Artillery Observation and Photography, and occasionally one finds the belief that it can be treated of entirely within those two branches.

It is, of course, a fact that during stationary warfare it was easier and quicker to photograph the number of trains in a station than to count them. Even from low heights, it was easier to photo-

graph a battery position or a new trench than to write a report in the air.

But it was often as a result of personal reconnaissance that the most useful photographs were taken, and photographs frequently disclosed features which could not be interpreted except by personal investigation. Consequently, even in stationary warfare, personal skill must be encouraged as much as possible; first, because the best results cannot be obtained without it; secondly, because it whets the interests of pilots and observers; and thirdly, because, in moving warfare, it will be of far greater importance than photography.

Further, to substitute the camera for observation is to mechanicalise reconnaissance, and that is prejudicial to intelligence and moral. I feel that the use of the phrase "mechanical warfare" where "technical warfare" would be more correct, leads to an attitude of mind which is unprogressive. At all events corps and armies relied too exclusively on information by camera, and failed to encourage personal reconnaissance —often ostentatiously disregarded it. It was remarkable that very rarely, if ever, did the lower formations of the R.A.F receive orders for reconnaissance beyond verbal and vague instructions.

Areas of responsibility were as follows:—Beyond 15 miles G.H.Q. squadrons reported on rolling stock activity, railway development (sidings, switches, etc.) dumps, aerodromes, strategical defence lines. This was generally done twice a week by single-seater reconnaissances equipped with camera, oxygen and heating apparatus, and flying at a height of 20,000–22,000 ft. The middle area, 7,000 yds. to 15 miles, was reconnoitred rather more frequently by the army squadrons, and the area up to 7,000 yds. was under daily observation by the corps machines. As regards what can be seen from an aeroplane, S.S. 205 gives a good account and there is no need to enlarge here upon that manual—except perhaps to draw attention to the danger of relying on negative information from the air.

The absence of orders was referred to above, but by liaison with battalion, brigade and divisional intelligence officers, a Squadron Commander was able to give every pilot who went out on any sort of war work, orders for some reconnaisance or other. The Corps should always insist on this being done, and they should point out tactical features which might be overlooked in the air—for example, the map showing the probable location of anti-tank guns which was furnished by the Tank Corps, was of the greatest value on the 8th August. Besides usefulness for training purposes, a large volume of information was obtained, the value of which was apparent whenever the Corps required any particular reconnaissance. Reports were collated by the Flight Commanders concerned and the B.I.O. He was a corps officer attached to the squadron and the staff were inclined, in spite of the immense value of liaison in every branch of co-operation, to rest upon his activities rather than themselves get in touch with pilots. During operations, however, contact pilots almost invariably saw the B.G.G.S.

IV. Communication.

As regards communication contact patrol work was the main duty of the R.A.F. in 1918. It is too well known from S.S. 135, Appendix B., to require description, but it should be noticed that in this work it is the observer who makes the report, because the pilot has, at a low height, to give his best attention to flying the machine, and because the observer is not required to be a machine gunner, since attack by enemy aircraft is negligible below 2,000 ft.

"Contact" communication appears simple and straightforward, but in practice it was difficult. First the pilot and observer had to be well accustomed to work together; secondly, they had to know the ground without a map, as the pace was often too fast to refer from one to the other; thirdly, the infantry frequently were unable to signal either by flare, flags or disc; fourthly, smoke occasionally screened the whole attack; and fifthly, the pilot had to be expert in flying a heavy machine near the ground; sixthly, the aeroplane had to fly in the barrage and was an easy mark for the infantry. To instance the last statement, between the beginning of the Third Ypres Battle and November, 1917, one pilot was shot down from the ground nine times.

It should be remembered that the allotment of machines for this task was one flight per corps, *i.e.*, three machines per division in the attack, and that that flight was, up to the moment of the assault, engaged in observing for bombardment and wire-cutting. When the attack was launched, trained personnel had very soon to be replaced by others. These were usually obtained from the counter battery flights, who had not so much to do in the battle, and could absorb and train new pilots and observers more easily. Often contact pilots and observers were drawn from squadrons in a quiet part of the line.

That was as far as this form of co-operation with the infantry had progressed in the war, and it is obvious that it can be vastly improved upon. During stationary warfare co-operation with artillery was more important, and consequently very few machines were allotted for infantry work and little training was carried out for it. In moving warfare the reverse should be the case.

Other forms of communications were artillery location patrols, flying the Staff about France, and taking despatches to and from England. A squadron was kept near G.H.Q. for this purpose.

V. Fighting in the Air.

Fighting in the air vitally concerns the armies in the field. All other air activities depend upon its success. Even when superiority in the air has been attained, artillery and bombing pilots find knowledge of fighting tactics and power of manœuvre essential before they can perform their special duties. In 1914, the R.F.C. was almost wholly a reconnoitring force and fighting did not become general till 1915, when

each army began to recognise the importance of the other's air reconnaissance and to try to prevent it. In 1918, fighting by reconnoitring aircraft for their own purposes was a small part of the whole, and half the number of aeroplanes in France were designed entirely for fighting. These single seater machines, carrying two or four machine guns each, were sent well over the line (5,000–10,000 yds.) to attack enemy scouts, reconnaissances, bomb raids and artillery machines on their way to the line, and to protect our own bombing machines on the beginning and end of their journey. This constant offensive provided the best defence for our corps machines, as most of the enemy's aircraft were engaged beyond the corps area.

The impossibility of preventing single machines or even all hostile patrols from crossing the line cannot be realised without comprehending the immensity of the air and the difficulty from the air of seeing other machines in it.

Often an enemy machine will approach unseen up to 100 yds.—unseen because (*a*) it presents on your level a much smaller surface than it does to a ground observer; (*b*) attention is not caught by the sound, and by sound a ground observer first picks up a machine; and (*c*) most important, the observer, though looking in his direction, may have his eyes focussed wrongly.

The indication of targets was, therefore, one of the most important functions of A.A. guns.

Sometimes ground critics did not recognise the difference between climbing and flying speeds, and when they saw an enemy machine over the Corps front at 15,000 ft. would ask for Scouts to be sent after it. Suppose the German to have a speed of 90 m.p.h. and the Scout 100 m.p.h., the climbing speed of the Scout might only be 70 m.p.h., and until he had climbed 15,000 ft. the German would have a 20 m.p.h. superiority. If the climb takes 10 minutes the German machine will have gained lead of 5 miles, which would take half an hour to overcome and by that time the German will have flown 45 miles and be over his aerodrome, if not on it.

Besides machine performance, armament and pilot efficiency have to be considered. As regards armament, in view of the fact that most fights took place at 50-yd. ranges, and hardly ever was fire opened outside 100 yds., it is interesting to speculate on the effect that would have been obtained either if it had been possible to open effective fire at, say, 300 yds., or if we had obtained a 100 yds. superiority of range over the enemy.

The efficiency of the pilot is, however, as in other air operations, the principal factor in success—in this technical not mechanical warfare. What he required especially was to be a first-rate shot, and to have air experience. He had to care for his guns and be constantly practising firing at the range from the air; he had to know the armament of enemy machines, their blind spots, and to be able to take advantage of wind and sun instinctively. It will again be seen that in reckoning the air

work to be done by a squadron, flights over the line must not be taken as being the whole of the pilot's time in the air.

Scouts usually flew in one, two or three formations of six machines, and were on a line about 10,000 yds. in front of our trenches throughout the day. As the ceiling of machines reached 20,000 there came in the practice of flying two layers of patrols; the second layer flying at 12,000 to 15,000 ft., and being nearer the line both for the sake of forming a more effective screen and for training new pilots.

There were also special missions which included the escorting of bombing machines for part of their journey, *i.e.*, up to the petrol capacity of the Scout, the protection of long-range artillery, observation machines, and the answering of wireless calls. The latter was very popular. The Scout waited on his aerodrome until our wireless intelligence picked up and located the calls of the German artillery observation machine; on receiving the location he went on his mission, which was practically always successful.

Some pilots were allowed to work individually; Bishop, for instance, having perhaps led a patrol in the morning would go up in the afternoon with the sun behind him, and wait for German machines. Keeping in the sun, he would come up to a hostile machine, and, if unobserved, fire a burst or two; if unsuccessful, he would break off the fight. The efficiency of good shots was remarkable. Guynemer hit an English pilot with the only two shots he fired at him, and those were fired in a hurry. Out of eight shots at a German machine, he hit the pilot with five; and Fonck shot six Germans down in one day, using only 52 rounds. But such shots were as rare as patrol leaders like Mannock and Richthofen.

This may give the idea that fighting by Scouts was easy, pleasant, and well rewarded, and official *communiqués*, of course, lent colour to that idea. Such figures as 45 enemy destroyed, 22 driven down, 10 of ours missing, are misleading, because the word "missing" is deceptive. Casualties on our side of the lines were not published.

Foreign governments used to advertise widely the achievements of their principal fighting pilots, and this may have been one reason for the inferiority of foreign flying corps in other branches of flying. In fact, only in low flying and night flying was there little fighting: the first, because it is almost impossible to fight below 2,000 ft; the second, because night-flying by Scouts was only undertaken in France towards the end of the war.

There is not space to write of such things as the adverse effect of the prevailing wind on fighting or of light signals, or of special forms of ammunition, but two psychological considerations may be noted. These apply to all pilots, but particularly to Scouts.

The first concerns the loneliness of flying. A pilot compared with an infantryman works in peculiar isolation; he is in an immense space exposed to the view of everyone, he can never stay still, never take cover, never feel "shoulder to shoulder" with anyone. Even if he is in formation no one can help him; if he is wounded there is no first aid; if his

machine bursts into flames, he cannot get out. A small engine failure may defeat him, and if he is off colour, he will every moment be expecting his engine to fail. There is no need to stress this aspect of flying, for if a pilot has sufficient rest and recreation he never considers it. But such conditions do not always, perhaps do not often, prevail. Divisional baths, canteens, cinema shows, and " Folly " entertainments were seen to increase fighting efficiency in the infantry; the Army Staff in considering pilot-efficiency should remember that the recreation and discipline questions are different from those they are used to even if they are not more complex.

The suggested replacement on the N.W. Frontier of two-seater by single-seater machines raises, for instance, certain psychological considerations, which are thoroughly discussed in a pamphlet by J. L. Birley, entitled " The Principles of Medical Science as applied to Military Aviation."

The second concerns the immense advantage which flying has over any other kind of fighting. I do not mean the comfort of the aerodrome or the past immunity from gas, but the opportunities it offers. A pilot feeling very well after a good breakfast can get into his machine and go out and find as much trouble as he wants. On reconnaissance or artillery observation, he can sit far over the lines knowing that he is annoying intensely the enemy infantry and the enemy archie. A Scout can contour-chase, balloon-hunt, or fight E. aircraft just as much as he pleases. This easy opportunity of personal expression, well described by Maurice Baring in " R.F.C. H.Q.", is denied to the infantryman or the gunner.

Besides these exceptional opportunities, the pilot had the excitement of open air and speed, and the stimulus of feeling himself to be before the army. When he was being hotly " archied " it gave him a sense of exhilaration if he thought that several thousand people on the ground were wishing him luck. It made a difference in a fight.

Nevertheless, publicity had disadvantages and led to certain misconceptions. If an enemy bombing formation came over, our Scouts, who were 5 miles over the line, were sometimes thought to be on the ground. Perhaps an artillery observation machine was expected to break off his work to chase a fast German Scout. And if, as sometimes happened, our machines fired at French or Belgian machines, the widespread belief that Germans were flying under our colours was strengthened. An attempt to prove this untrue (as indeed it was) gave fresh grounds for this belief, and led to troops shooting at our own machines even up to July 1918. Again, anyone who has been up on a misty day when the sun is out will know that it is possible to see away from the sun, but impossible to see even a few hundred yards into it. Consequently on certain mornings the Germans were working before us, yet the Corps would demur at the explanation that it was misty, and the sun still rose in the east.

VI. Bombing.

Bombing has been so frequently described that it may be dismissed very briefly in a paper of this character which is mainly written from the point of view of a Corps Squadron Commander. One thing, however, is always apparent, viz., that there are not enough machines to do the bombing required. Consequently the following questions often arise, and the Staff must know the answers :—

(1) What bombing power can their squadrons exert?
(2) What targets are to have preference?
    (*a*) Communications and railway centres.
    (*b*) Dumps, stores, factories.
    (*c*) Troops.
    (*d*) Enemy aerodromes.
(3) Having chosen the targets, what results can be expected?
(4) Should bombing power be concentrated and repeated, or should it be exercised with the greatest surprise effect obtainable?
(5) Lastly, is the normal bombing power to be reinforced by Corps and Scout squadrons carrying bombs, and if so, how will the routine work of those squadrons be affected?

It would take a long time to review bombing in 1918, with the object of supplying answers to these questions, and longer still to discuss the answers. But there are three observations that may be in place.

First, for certain targets the moral effect of bombing is to the material as 20 to 1. Also there is a "moral-material" effect, such as the effect of bombing on the industrial output of Nancy and the Rhine towns. The cessation of work, the putting out of lights, and the stoppage of trains due to the mere threat of a raid, may prevent the product of a million man-hours. That is as effective as destroying that product by explosive. Yet, because there is no material evidence, it is being forgotten or denied. As to the purely moral effect which filled the Tubes and raised the rents in Maidenhead and Brighton, our attitude recalls the remark of Mr. Jorrocks, who, when he was asked after a fall if he was hurt replied, "Not at all, not at all—rather the contrary."

Secondly, bombing by Corps and Scout squadrons must be viewed not only as regards its interference with normal routine, but also in its effects on the pilots, who will require time for getting accustomed to another type of flying.

Thirdly, it must be remembered that we never experienced the effect of bombing power. We can only speculate as to what would have happened if the Germans had used their air force in March, 1918, to disorganise our retreat, or in August and September to hinder our advance.

VII. Low Flying.

The term "Low flying" was used to describe close offensive action by aircraft against troops. It excludes contact work, but generally

includes bombing by Scouts. It began as an amusement, or as an extension of target practice from the air. The effect of it in Salonica and Palestine was devastating, and considerable successes were claimed for it in March, 1918, when several squadrons were sent to the Somme front from other parts of the line. But the Staff should have in mind the possibility that the employment of machines on low flying may affect the struggle for supremacy in the air. Occasions might arise when the choice of either would present itself, but the attainment of both would be impossible. For example, in March, 1918, one Scout squadron had three machines left at mid-day; and out of one Scout wing sent to bomb a bridge, 37 machines were shot down. In the first case the price of harassing the German advance was not high, in view of our superiority in the air; in the second, it is doubtful whether the damage done by Scouts each carrying only two 20-lb. bombs was commensurate to the loss of air-fighting power.

Further, preliminary reconnaissance is essential to successful low flying. I recollect a certain Scout squadron being brought up hurriedly to do low flying in the Ypres salient, and some of the pilots bombed and machine-gunned the canal. The blame should be borne in part by the Command who ordered the attack, without giving time for reconnaissance. These Scouts, even if they had known the Ypres front, would have been accustomed to the following sort of map reading. They would have passed over Cassel at 10,000 ft., and seen Ypres about five minutes away from them; they would have followed the road to Menin, and stayed at 17,000 ft. with Courtrai and Roulers as landmarks; they would have moved in an area 10 miles long by 5 miles broad and 20,000 ft. from floor to ceiling, and could have put a circle round the area in less than a quarter of an hour. But they were ordered at a moment's notice to operate in an unknown area only 2 miles square and 500 ft. deep under conditions of pace that make map reading difficult for the most experienced.

VIII. Transportation, Co-operation with Tanks and with Cavalry.

There is little to say about these branches of activity within the scope of this paper, but that is not a measure of their importance or of the possibilities of their development.

In 1918 there was practically no call for transportation by air in France. Filled machine gun belts, S.A.A. pigeons, photographs, and grenades were dropped for the leading troops in the IInd Corps advance. The Belgians did call for aeroplane transport, but only one corps squadron could be made available, and that for a very short time. The 13 tons of rations which that squadron transported did, however, ease a very critical situation.

Similarly there was little demand in France for aircraft co-operation with cavalry, and the subject is better studied in connection with the Palestine Campaign, where, incidentally, aeroplanes were first used for evacuating casualties.

As regards tanks a good deal of experimental work was done, but as it was not until 1st July, 1918, that a squadron was attached to the Tank Corps, co-operation in battle was confined simply to communication by message dropping, and offensive action against anti-tank weapons. If this slow appreciation of the possibilities of air co-operation with tanks, and the small allotment of machines to it, seems extraordinary, it is worth while to remember how great were the demands in 1918 for machines, and recollecting all the demands which were fulfilled 10 years after the invention of flying.

IX. Special Duties.

Other forms of air activity, such as special telephony machines, agent carrying and balloon hunting, do not require separate mention, except in so far as they must be taken into account by the Staff in allotting aircraft for co-operation with the field forces.

JUTLAND AND THE PRINCIPLES OF WAR.

(Concluded).

Translated by Permission.

Part II.

FROM the tactical point of view, the Battle of Jutland offers many problems of the greatest interest. Limits of space oblige us to confine our attention to three, which, from their general character, seem to possess a permanent interest; the value of manœuvre, the *rôle* of an advance guard, and the choice of range.

One of the most striking features of this encounter is the absence of an idea of manœuvre on the part of both combatants. We mean by this, that not only was there on neither side the smallest attempt, but that it does not seem that the instructions issued by the two Commanders were inspired by any desire, to out-manœuvre the enemy.

Unacquainted as we are with the fighting instructions of the Admirals, we are naturally reduced to confining ourselves to an examination of the facts themselves, the formations and evolutions of their fleets in battle, in order to deduce some notion of their tactical ideas.

It must be admitted that the situations of the adversaries were very different. Von Scheer having been completely surprised, not having even succeeded in ascertaining the real situation until the end of the day, was evidently able neither to think out, nor to prepare, a tactical manœuvre. Lord Jellicoe, on the other hand, with the knowledge of the presence, position, and course of the High Sea Fleet some time before actual contact was made, and informed by his strong scouting formation after actual contact, was in ideal conditions for manœuvring; but he actually did no more than to steer for the point at which he calculated contact would be made, according to the estimated course of the enemy.

Nor when, having got within range, he finds that the axis of his formation is not going to strike the centre of the enemy's fleet, but to fall well ahead of his guide, does he think of making use of this very favourable position, as we shall try to show, by a manœuvre aiming at the destruction of the enemy's van.

Tactical ideas and tendencies may be resolved into two battle theories, which, for want of a better terminology, we call the " parallel battle " and the " manœuvre battle."

The former is characterised by complete equivalence of tactical positions at the beginning of the engagement. There is no other preoccupation on engaging than that of bringing all one's guns into action *simultaneously*. The most sure means of obtaining this result

is evidently to engage the enemy in a compact formation, deployed on a line normal to the bearing of his centre. It is quite obvious that if the two adversaries act in the same manner a rigorous parallelism must result. In this system, the decision depends solely upon gun-power. Only when equilibrium has been broken by the effect of gun fire is an attempt made to exploit the advantage thus obtained, and that must then be by an improvised manœuvre inspired by the situation.

In the second system, on the contrary, the aim is no longer to obtain a decision by the effect of gun fire alone, but by a combination of fire and movements, *in breaking the enemy's tactical equilibrium from the beginning*. Manœuvring, in the tactical sense, means acquiring a relative position, such that one can bring the whole weight of one's fire upon a predetermined fraction of the enemy's force, the remainder being rendered incapable of taking part in the action, or being able to take no more than a feeble share.

The supporters of the theory of the parallel battle naturally do not deny the superiority of such an initial position, but they dispute the possibility of acquiring it at the beginning of the battle, except in wholly exceptional cases; such as a complete surprise arising from restricted visibility, negligence, or contemptible unskilfulness on the part of the enemy. They consider that one should be prepared to take advantage of such opportunities, but that one cannot build up a battle system on so fragile a base. Also, that, on account of the extreme mobility of naval forces, a position of advantage, even when procured by surprise, will always be ephemeral, capable of being maintained for a very short time only, the enemy naturally endeavouring to restore equilibrium. In order that the advantage procured by such a tactical situation may be really great, it would be necessary that the methods of using the guns should be such as to obtain a decisive result in that short period. Now, everyone knows that massed firing is far from obeying the law of proportional results. One may even say that it never approaches to it, and all advantage of position amounts to no more than a mere geometrical fiction if it cannot immediately be translated in terms of hitting.

To seek a theoretical advantage by means of movements would therefore be but a vain effort, particularly if it is obtained at the cost of efficiency of gun fire.

The theory of the " manœuvre battle," which is of relatively recent origin, is the result of a determined intellectual movement in our Navy arising out of the creation of the " École Supérieure " and the development of historical study. Its supporters consider the parallel battle as an inferior form of tactical art. Their argument may be expressed thus. The parallel battle means that a decision is looked for by the sheer mechanical means of gun power; that is to say, if the opposing forces are equal, it depends upon *luck*—one or other of the adversaries being able to profit by lucky shots. It only admits of a mediocre utilisation of numerical superiority on the part of the stronger, it removes

all possibility of victory from the weaker. Further, history teaches us that it generally leads to indecisive, and therefore sterile, actions. Great successes fall only to the forces that manœuvre, who succeed in achieving a rapid decision by a powerful concentration of force.

Manœuvre is the only means a weaker force possesses enabling it to compensate for its numerical inferiority by skill and boldness in its movements. Far from hindering the action of the artillery, it tends, on the contrary, to increase its destructive effect, having nothing in common with those frenetical movements with balls and cones to which our pre-war tactical science appeared to be confined. Those are the ordinary adjuncts of a parallel battle, but not of a manœuvre battle in which only very simple movements are used.

It is true that advantage of position can only be obtained by surprise, and must be maintained for a certain time, in order to gain a decision. But these two conditions may very well be realised, the former by approaching in the sector of least visibility, in driving in the scouting system of the enemy and also by the use of discharge of smoke or artificial fog; the latter by a division of the fleet into two principal groups, of which one has the duty of holding and limiting the freedom of movement of the chosen objective by engaging it in the parallel form, the other that of carrying out the decisive attack by taking the enemy, thus deprived of his liberty of movement, in enfilade.

Its principle being concentration of force, manœuvre naturally presupposes the possibility of concentration of fire. It matters little that collective fire diminishes the number of hits per gun of each unit, for this drawback is compensated for by the fact that a great portion of the enemy's artillery finds itself out of action. If the fire results are too small it merely proves that our methods of firing are bad and that they must be perfected.

It is not true that the success of a manœuvre must depend on some mistake or serious unskilfulness of the enemy. Besides, for what reason is it less rational to base a fighting system on the aptitude of human beings to make mistakes than on their tendency to be infallible? If the sea were always a smooth mirror, the atmosphere clear, and men incapable of making mistakes, history could certainly never have recorded those undoubted phenomena called the Saints, Trafalgar, Lissa, and Tsushima.

Thus, experience abundantly demonstrates both the possibility of the manœuvre battle, and the evident superiority of this form of fighting over the parallel, symmetrical, equilibrated battle. The first represents what Bernhardi has properly called the conception of war appertaining to genius, as opposed to the purely mechanical conception. It is founded on the application to tactics of those immutable principles, of eternal truth, independent of time and space—Economy of force, Concentration, Security, Swiftness of execution, &c.

To this doctrinal affirmation those who despise history reply, not without some bitterness: "Your system is pretty, but it represents no more than a set of ideals without any experimental foundation so far

as modern fleets are concerned. Your plan for a manœuvre battle, in no sense original, is nothing but a simple adaptation of classical theory to a naval battle, derived by the École Supérieure from a study of Napoleonic battles. It is by no means certain that this theory emerges intact from the war on land in the late war. But its application to the sea appears far more risky, the conditions of the two fields of battle being very different.

"Experience undoubtedly proves that on land it is still possible actually to achieve tactical surprise in spite of the many means of obtaining information that are available. But that this is so is owing to the fact that it is possible to concentrate a strong force behind a solidly organised front, and then swiftly to transport it to the sector selected for attack. The mechanism of economy of force in this case rests essentially upon the power that a body of troops possesses of increasing its power of resistance by making use of ground. Such possibilities do not exist in a naval battle, where, usually, and even for the most numerous fleets, the maximum extent of front does not reach beyond visual distance; where the field of battle is a flat plain, exposed to the eyes of all; where no means exist whereby a numerically weaker force can artificially increase its power of resistance, defender and attacker finding themselves acting under conditions so identical that the very words become, in a tactical sense, meaningless; where, finally the artillery is so powerful, and the opening movements so swift, that simultaneous engagement of every unit becomes almost essential, so that it becomes difficult to conceive how a reserve can effectually be brought into play.

"The historical examples that you invoke prove little, and certainly cannot usefully be applied to modern fleets. The replacement by steam of the slow, capricious, and uncertain motive power of the wind, the extreme mobility steam confers upon fleets of to-day, the immense increase that has taken place in the powers of guns and torpedoes; the consecutive growth of battle ranges—all these factors contribute to render the acquisition of a definitely superior tactical position more difficult; while, on the other hand, they make it easier to re-establish equilibrium.

"What lesson can you draw from Trafalgar, that single and famous example of the complete application of your theories that is applicable to a modern battle? We do not wish to hurt your feelings in appearing to misunderstand the value of the Nelsonian idea, but you will agree that the true meaning of that unfortunate day is that any license is permissible when one is opposed by an inert, passive and incapable enemy. It is obvious that to-day we could not employ the actual movements then used. The possibilities of manœuvre in a sailing fleet arose, above all, from the fact that the effective range of the guns was much less than the length of the lines of battle, and that their arc of training was practically nil. All that is changed. It is quite useless to quote Lissa, for the torpedo has appeared since then, and it seems doubtful whether Tegethoff's charge could ever be repeated. Finally, there is Tsushima,

the only example that is applicable to the fleets of to-day. We have what is called "the Tsushima manœuvre." If there really was, from the beginning, an intention on the part of the Japanese to manœuvre, an idea of concentrating all their force on the left column of the Russians, these being supposed to be in two columns, we know that in fact this idea could not be realised. One could as well argue that at 14 h. 15 m., during the Japanese 16 point turn under fire, the Japanese were from a tactical point of view in an inferior situation to that of the Russians. *Practically* in its initial and decisive stage the battle of Tsushima was only a vulgar parallel battle. There was concentration of fire, but no concentration of force by manœuvre.

"Thus, even when opposed by an inert, resigned, and awkward enemy, and in spite of circumstances favouring, in a high degree, surprise —thick weather, total lack of scouting on the part of the Russians— Togo did not succeed in carrying out the manœuvre that he intended, simple as it was. So far from Tsushima being evidence in support of your theory, it seems to us, on the contrary, to be well chosen to disprove it.

"Thus your system is excellent, your principles command respect, but the possibility of applying them to actual fleets remains highly uncertain, for the rare precedents that you invoke throw no light whatever on the subject.

"It seems moreover that you yourself are aware of this, for when you are asked to show the tactical processes by which you envisage the realisation of your ideas in a modern battle you declare at once that all prevision is impossible, that the manœuvre can only spring from a happy inspiration, that it is an affair of *coup d'œil*, and that genius is not to be taught. These replies bear witness to a certain degree of embarrassment that can easily be understood, for at the same time you state that only simple movements can be carried out during the time of the stress and excitement of battle, movements studied in peace exercises and described in some memorandum, with plans to explain them. But is it really reasonable to expect those to whose care you confide the business of resolving the difficulty to possess more creative imagination than you yourselves evince in the matter?

"Do you recollect what we have laboriously done in this direction in the course of innumerable manœuvres, and the distressing regularity with which these peaceful engagements resolved themselves into that primary form for which you express such contempt? In vain used an impartial umpire to try to break down this insipid symmetry by distributing casualties of helm or engines to both fleets! Futile hope! Nothing could overcome this dismal attraction, and the two adversaries, with peaceful indifference, continued to fight on parallel courses!

"We have certainly succeeded in formulating principles of such a general and quintessential type that are practically immune from the injuries of time and the surprises of space. But these transcendental metaphysics are of value only to the extent that practical use can be

made of them. Do not count too much on tactical ability springing into existence by the sole power of Words."

The guardians of orthodoxy are unmoved by these impious words, these evil counsels; they meet them with the serenity that Certitude alone confers; they are accustomed to the facile irony of their opponents.

"Men of little faith," they say, "do you reproach us for being powerless to prepare a book of recipes to which you have only to apply to counter the enemy in every particular case? Nothing would be easier than to supply a certain number of prearranged plans in black and white; but it would be a wholly useless thing to do, for on the little battlefield of a piece of paper you could easily show that every manœuvre can be parried by a proper counter move, and even that it is more dangerous to manœuvre than to remain quiet. The argument to which you constantly return, that movements in the open sea cannot be concealed, proves more than anything else your lack of power of imagining the real conditions of battle. In the old days our forefathers were so blinded by powder smoke that they even lost sight of their next in the line. Our funnel smoke of to-day, even when it is not artificially stimulated, produces the same result only too well; and do you *really* believe that it is an easy thing to inform oneself, at a distance of 10 or 12 miles, of the formation, course and motions of a considerable fleet of battleships, surrounded by its mass of cruisers and torpedo craft? Use an effort of imagination and try to picture the scene of Jutland; put yourelf on the bridge of the Lützow by Von Hipper's side at 18 hrs., when he suddenly sees flashes to the N.E.d. and a little later enemy fire opening successively from right to left. Then transport yourself to the Friedrich der Grosse, several miles to the southward, double, even triple if you like, your power of sight. Do you think it would be easy immediately to distinguish the composition, or the real strength, of those detachments that are appearing on that half circle of the horizon?

"Political necessities have made us into a Mediterranean Navy, and the effect of this is to falsify our judgment to no small extent. The conditions in which our manœuvres are—or rather were—carried out only add to the trouble. Generally undertaken at a season when the wind is light, the sky clear, the sea smooth, using insufficient forces, poorly provided with cruisers and destroyers, small squadrons carefully equalised and naturally imbued with the same tactical views, so that each side can easily foresee the probable attitude of its opponent, how could action result otherwise than in a parallel battle, which moreover is recommended, and to some extent actually forced upon them by their old tradition of fighting, in spite of all precautions? Such exercises, *however useful*, will never produce any more than a feeble idea of the realities of actual battle, for the combinations, the tactical possibilities, and the difficulties increase with the numbers engaged out of proportion to those numbers.

"You are too prone to see nothing more in a manœuvre than its geometrical factors, and it is not difficult for you to point out the ease

with which a counter movement can be designed that will counteract the temporary advantage it confers, calculated in terms of the numbers of ships engaged. But the question really goes much further than that. You take insufficient account of the immaterial factors that are always present in battle. The moral effect of a manœuvre, even though the object be only incompletely attained, will be far greater than its material effect.

"We readily grant you that a manœuvre, even though well conceived, will often fail to achieve its object, and the fighting will resolve itself into one or many parallel actions. But even under those conditions, he who is satisfied with remaining on the defensive will always find himself placed in a morally inferior situation. To manœuvre is to *act*, and in this matter experience is found to be in agreement with reason in showing that he who acts, dominates; he imposes his will upon the enemy."

The discussion could be prolonged. It is an old quarrel which will probably never die out, because it represents the opposition of two fundamental human tendencies, it is the result of collision between the idealists and the realists, between the tacticians and the gunners; it is the result, to put it briefly, of the clashing of those lines of thought denominated by the qualitatives "objective" and "subjective."

It is true the line of demarcation is not so clear cut as, for reasons of clearness, we have supposed above. Both schools of thought admit that success depends upon the interaction of gunfire and movements, but they differ in the order in which they believe these common factors should be made to act. The former school contends that tactics are conditional on gunfire, and are possible only when the gun has opened the way for them. *Fire first in order to be able to manœuvre.* The second, on the contrary, consider it possible to obtain a tactical advantage from the beginning by means of manœuvre, and without the preliminary intervention of the gun. *Far from conditioning tactics, fire is only its dynamical expression.*

The arguments advanced by both sides are strong. It does not appear open to argument that in principle the manœuvre battle is the higher type. The whole question is to know whether, before a gun has been fired, while the enemy's liberty of action and moral force are still unimpaired, it is possible by means of movements alone to obtain a position of tactical advantage, and, above all, to maintain it long enough for the concentration of force that is thereby brought about to overthrow the enemy's material or moral equilibrium.

This is the capital question. The history of steam fleets unfortunately fails to give us any answer; its poverty is indeed distressing! The only attempt that is worth recording is that of Togo at Tsushima, and that failed in spite of an uncommonly favourable set of conditions.

Thus, lacking experience from which conclusions can be drawn, each school holds to its own opinion. Excellent arguments can be brought forward on both sides. We have tried to set them out impartially, but

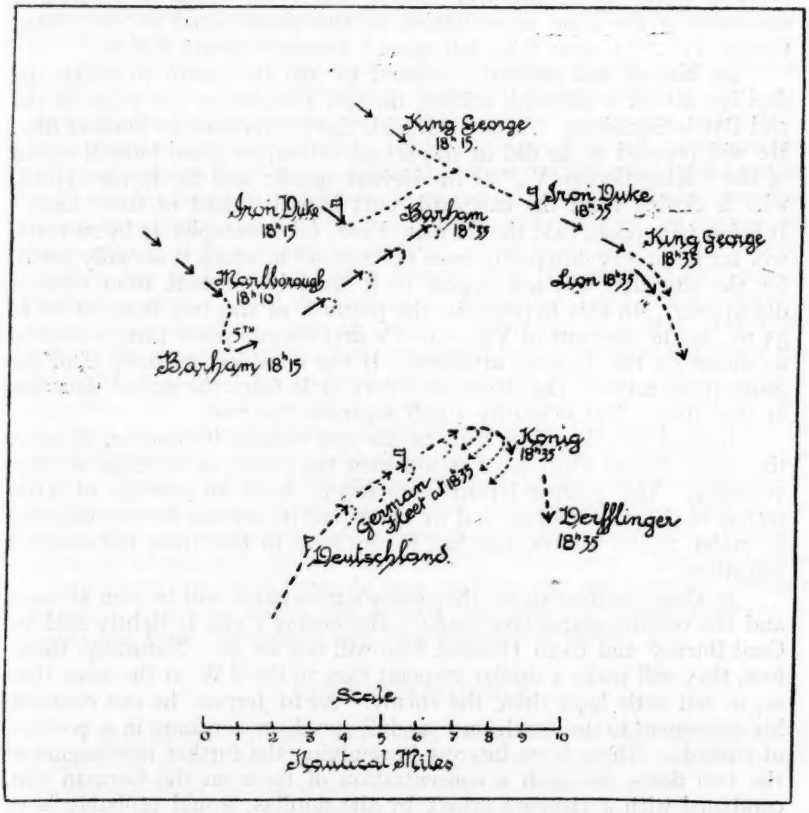
as there is no worse opinion than none at all, we must confess our secret inclination for the historical school and its legitimate child—the manœuvre battle. There is some merit in making this admission, for we are taking part in a lively reaction against this school and its works. The times when it reigned, an uncontested sovereign, over all men's minds, have gone by. Its views are discussed and attacked vigorously, and what is more to the point, intelligently. Its dogmatism, its abuse of comparisons, even its very vocabulary, are attacked.

It seems that the new line of thought that has been born of the war does not recognise so acutely the analogies that connect galleys with steamships, and fireships with both torpedo boats and submarines. The Strategy of the Anabasis and the Commentaries leave it cold. It does not believe that a profound study of the battle of Cannæ can throw any light upon tactics, it disputes the competence of Xenophon, Cæsar, Alexander and Napoleon on the same subject, and finds Jomini, Clausewitz and Mahan frankly boring. Have we arrived at the twilight of the gods?

In this crisis the humblest disciples must bring their modest meed of help to the historical school. Let us try to discover how a doctrine of manœuvre would have affected the battle of Jutland. There is in this no question of trying to show what could or should have been done—that indeed would be a foolish undertaking—but, simply taking a real situation from its opening stages to illustrate the difference between the two tactical methods. Let us then imagine that the Grand Fleet is led by a chief who is imbued with the spirit of the feeling for tactics; that he is penetrated with the principles of Economy of force, the Mass security; and let us take up the exact situation of the two fleets at 17 h. 30 m. on 31st May, three-quarters of an hour before contact was made.

All that Lord Jellicoe knows at this time is that the German Fleet is standing to the N.N.W. in pursuit of Beatty's Squadron. Acting upon the information he has from his cruisers he shapes course S. 48 E., his sole and guiding desire being to join battle with the enemy at the earliest possible moment, for the hour is late and Beatty is in need of support. He calculates, however, that his centre will fall, approximately, on the van of the enemy, and, being a believer in manœuvre, he makes the following plan:—Hold the two leading squadrons of the enemy with the starboard wing squadron, the First (Sir Cecil Burney) reinforced by the 4th (Sturdee), by deploying these three divisions into the wake of the Fifth squadron (Evan Thomas), which is already in action; crush the leading enemy squadron by a decisive attack with the left wing, the Second Battle Squadron (Jerram) proceeding East in order to envelop the enemy's van from the North and East. The Commander-in-Chief himself with the Third Division, which he leads personally, will join either Burney or Jerram, according to whatever the situation may prove to be when contact is made. Finally, all the flotillas will be launched into the attack as soon as the enemy begins to waver under this hammer-blow.

This plan has shaped itself in his mind about 17.30, three-quarters of an hour after the main body of the enemy has been located by Sir David. Lord Jellicoe signals it to his Commanders, and at 17 h. 45 m., feeling that the enemy is now not far off, he decides to take up his battle formation. Let us suppose this to be squadrons disposed abeam, with a wide space—say, 1,000 metres—between the squadrons. The Grand Fleet will thus form itself into three unequal columns; to the left the 2nd Battle Squadron ("King George"), in the centre the Third Division ("Iron Duke"), on the right the 1st Battle Squadron, reinforced by the Fourth Division. Each column has a flotilla of destroyers ahead of it. At 6 o'clock the speed of the Third Division is reduced to 18 knots in order to hasten the movement.



From 17 h. 45 m. to 18 h., Lord Jellicoe has received successively the signals from the "Black Prince," "Comus," and "Defence." They all indicate that the enemy is further to the southward and

westward than he expected. Nevertheless the situation does not yet appear very clear to him. But at 18.00 the veil begins to lift. The "Lion" appears; she comes out of the fog to the south-westward from the "Iron Duke," steering E.N.E. Can it be that the enemy, having inclined to starboard, is steering, not to the N.N.W., but to the E.N.E., at right angles, that is to say, to the supposed course? It is still no more than a presumption, for Sir David Beatty is perhaps manœuvring to envelop the head of his line. But even if this be so, there is no reason to modify his plan. Its execution will only be the easier and its effect more crushing. The C.-in-C. asks for information from those of his lieutenants who alone can see the enemy, Sir David and Evan Thomas. The replies arrive at 18 h. 14 m., and at 18.16, his decision being taken, Admiral Jellicoe hoists the signal to proceed in execution of the plan, accompanied by this short signal to the "King George V.": "Course S.E., full speed: Enemy's course E.N.E."

He himself will naturally proceed to join the group to which the decisive attack is allotted, leading the 3rd Division in the wake of the 2nd Battle Squadron. As to Sir David, there is no need to think of him. He will proceed as he did in the actual action, to place himself ahead of the "King George V.," at his highest speed; and Sir Horace Hood, who is closing from the eastward, puts himself ahead of the "Lion." It is fair to suppose that the German Fleet, taken completely by surprise, will act in no way differently from the manner in which it actually acted, for the situation will not appear to it sensibly different from what it did appear. In this hypothesis, the position of the two fleets at 18 h. 35 m., at the moment of Von Scheer's first sixteen-point turn, would be as shown on the diagram attached. If one considers no more than the geometrical factors, the situation differs little from the actual situation at that time. But in reality a gulf separates the two.

Instead of only a few units in the rear coming into action at once, the whole Grand Fleet is in action with the enemy at a range of clear visibility. The Jellicoe-Jerram detachment is at an average of 9,000 metres of the enemy's van, and we know that its fire can be very effective at under 10,000 metres, nor has it anything to fear from the enemy's torpedoes.

In these circumstances the enemy's manœuvre will be seen at once, and the counter-manœuvre made. The enemy's van is tightly held by Cecil Burney and Evan Thomas, who will not let go. Naturally, therefore, they will make a similar 16-point turn to the S.W. at the same time as, or but little later than, the enemy. As to Jerram he can continue his movement to the southward at full speed, or continue in a position of enfilade. There is no interest in studying the further movements of the two fleets, for such a concentration of force on the German van, combined with a vigorous attack by the flotillas, would probably have sufficed to bring about a decision by 18.35. Taken in this powerful vice, Von Scheer could not have escaped his destiny.

It will be observed that in all this we have put Lord Jellicoe in

the precise situation that he actually occupied at 18 h. 15 m. on the 31st May, both in a geometrical and intellectual sense. We have made use of no other information of the enemy than what he possessed at that very time, and neither have we assumed opinions as to the situation different from those he actually formed, for we know that he very correctly appreciated the relative situation and course of the German Fleet.

Here, then, applied to a historical situation, is a method of manœuvre in reality. The conception of such a manœuvre demands no extraordinary talent, and its execution requires measures of extreme simplicity; there is no complicated evolution, merely a short signal to direct the course of a subordinate at the last moment. But naturally such a method of fighting presupposes that the Admiral is a tactician by conviction and by temperament, and that his fleet is impregnated with his doctrine, and has been prepared, by careful training, to put his ideas into practice.

Manœuvring, doctrine, and education were equally lacking in the British Fleet of 1916. Everything indicates, in fact, that its Chief was strongly attached to the old and traditional rigid " single line of battle "; for a mere arithmetical division into squadrons does not overcome the defect of want of flexibility. Admiral Jellicoe did not consider it possible to divide his fleet into autonomous groups co-operating freely according to a pre-arranged idea; united, not mechanically, but by the immaterial bond arising from a common doctrine. The late Lord Fisher, a testy teacher, has said of his eminent disciple that he possessed all Nelson's qualities except that of disobedience. Tactically, Lord Jellicoe appears to us to be the direct heir of Jervis. Moreover, if a fleet truthfully reflects the character of its Chief, we should feel no surprise at finding the little defect alluded to by Lord Fisher among Admiral Jellicoe's Commanders. We should search in vain on the waters of Jutland for one of those examples of initiative which constitute the great tradition of the British Navy. We see no signs of a Rodney, a Troubridge, or a Foley. All that Admiral Jerram, the guide of the fleet, did was tentatively to incline one point to starboard after the deployment. This is the fatal consequence of a system that destroys individual initiative. Further, when, at about 19 h. 20 m., the signal to " turn away " goes up in the " Iron Duke," no one is found to turn the blind eye and " not see Parker's signal." Everyone obeys like a good boy, and the Grand Fleet, as it opens out from the enemy, sees the promise of victory die.

CORRESPONDENCE.

I should like to make two short comments on that excellent and remarkable article by Captain Richard, about two points in which two equivocations of serious consequence appear to me to arise.

1st. *On the subject of the destruction of the enemy's organised force.*

Captain Richard very rightly observes that destruction can only be brought about by battle; that is to say, in most cases the battle

must be preceded by mutual consent. He concludes, not without some irony directed against those who have expressed it, that the principle, or at least the manner in which it is formulated, is exaggerated. But let us concur that where destruction cannot be effected, if the enemy's fleet that evades battle is blockaded in its ports the desired result would be obtained. We will therefore replace the word " destruction " by " putting out of action " and that gives us a revised formula, " the means by which naval force acts is in putting the organised forces of the enemy out of action."

If this putting of the enemy out of action can be brought about by destruction, so much the better : if one cannot make use of this measure, recourse must be had to blockade—this without prejudice to the new weapons that progress places at our disposal (air forces).

So here we are in agreement. And the old principle stands ! So true it is that it is of real importance to make use of expressions that convey the meaning that one desires to express.

All the same, when Captain Richard says that the essential object of naval force is " to maintain the integrity of the national maritime communications; to prevent the enemy from using his," I must object that those are the consequences, the corollaries. This double object is in strict fact brought about by putting the organised enemy forces out of action. This putting out of action is therefore the true, initial and fundamental object. We are brought infallibly to the classic formula which has some good in it, it would seem.

Then there is the case of the Russo-Japanese War. The destruction of the Russian Fleet at Tsushima was not indispensable, evidently : to blockade it would have been enough. But by every means its putting out of action was *indispensable.*

It was at the same time *sufficient*; for the Japanese had no other end in view than the unfettered conduct of their terrestrial operations in Manchuria, which was their only way of forcing Russia to come to terms, and there was no need to interrupt her whole maritime communications—a measure, moreover, which was of small avail so far as this great continental enemy, independent of the sea-routes, was concerned.

I see, then, nothing in all this that tends to invalidate the usual principle, provided it is expressed in a proper form.

The two rectifications above are, to my mind, very important, for they bear upon two essential points of doctrine. Let us protect ourselves by all means from taking the famous " Principles " as rigid rules, like bars of iron. Let us rather consider them as " elastic guides." But let us remember that without them we should drift in the uncharted, falling easily into strategical sophistries such as those of which Corbett, for example, has given in some disputable samples.

CAPITAINE DE FREGATE CASTEX.

I wish to submit some reflections to the author of the article " Le Jutland et les Principes " that appeared in the May number of the *Revue*

Maritime. I have no intention of embarking upon an argument, but as it is a question of principles, it is of the highest importance to see things clearly.

I think some hesitation can be detected in Commandant Richard's attitude towards the theory of the "Fleet in being." The fact is that though he does not like it, he is unable, as a good logician, to condemn it when he states his problem as he does. "It is not possible to assert that the idea is radically wrong," says he at one place. Then, a little further on, "the theory of the fleet in being, which amounts as a matter of fact to that of the uselessness of battle, is not absurd in itself, because at sea the destruction of the enemy forces does not constitute, as it does on land, the sole, necessary, and sufficient means of imposing one's will upon one's adversary."

But he corrects himself very quickly when he comes across it in practice, and he is severe upon the English for having applied it in the last war. "On this occasion," says he, "the thesis appears to us false, because the destruction of the German Fleet was, in this particular instance, a necessary condition to attain the true ends of naval force."

Whence comes this apparent contradiction—a theory which is not wrong in itself, but which one condemns in practice? May it not be that Commandant Richard omits some of the factors of the problem. "It would be wise," he says, "to begin by asking this question: By what means is Naval power able to attain the final end of war, which is *to impose one's will upon one's enemy?*"

Put in this manner, the question is insoluble. Naval Power in itself, whatever it may be, is never able to attain the final object of war. The enemy's will resides, in actual fact, in his Government, and this will rests above all upon the armies. So long as the armies hold the Government will hold.

A blockade, complete as it may be, will certainly inconvenience an enemy and diminish his power to resist. But his will can never be forced except by beating his armies.

Marshal Foch calls attention to Napoleon's saying that his object was to reach Berlin before the enemy. "To be at Berlin before them—there is the object in this war: by so doing we shall fall upon a Government without an army; that is, a Government without power. While at the same time the enemy's army will lose its Government and will therefore be deprived of resources."

Still more is there an objection to the idea that it would be possible to bring England to terms (and perhaps Japan) by destroying her naval power. But that is wholly a theoretical case: for it is very improbable, and history furnishes no example of it, that England will ever find herself without an ally in such a conjuncture.

Reasoning, generally, proceeds as though opposing navies played some disconnected part in war: but, in reality, it is incorrect to speak of a "naval war" or a "land war." There is *War*; of which, in repeating or generalising the formula propounded by Admiral Darrieus, I will say:

In order to make war, various forces are employed—army, navy, diplomacy, industry, press, and what not. The Navy is only one part, an important part, of course, but a part all the same, in this concert—and its action must be studied in *liaison* with the whole.

What is more, Captain Richard is well aware of this, for he writes: "If Russia had not been an ally, and her army a factor of capital importance, the view of a 'fleet in being' would have been capable of support, the advantages that Germany derived from her supremacy in the Baltic being negligible." But that is just the point. . . .

Why, in advancing his arguments, does he omit these primary factors? For—it would be vain to deceive oneself in the matter—the Army is the principal factor in the concern. It is the Army which in the long run will have the last word. Imagine, in the last war, that the French Army disappears, and one is bound to recognise that England would have been powerless to impose her will on Germany.

Far from wishing that the naval arm, by itself, should crush the enemy's will-power, we should simply ask ourselves "By what means can the naval power bring the most effective help towards attaining the final object of every war, which is to impose one's will on one's enemy?"

There is general agreement with Captain Richard in recognition of the rôle of the naval force being "to maintain in security the national maritime communications and prevent the enemy from using his." We used to call this "having command of the sea."

The divergences only appear in the choice of *means*. The partisans of the "fleet in being" do not desire battle; the others swear by it and nothing else.

If one omits from consideration the factors of time and the Army, there is no doubt that the supporters of "the fleet in being" theory are perfectly right. Captain Richard, while confessing his inclination for battle, admits it with good grace in his conclusion. "Battle, always desirable (he does not tell us why) is of use only to the extent that this destruction (that of the organised forces of the enemy) contributes towards attaining the double object of naval force; maintenance of the security, . . . etc." If the enemy goes to earth, the problem, limited in this manner, is resolved *ipso facto* without battle.

But it will be agreed that time is not a negligible factor, and that whether war is swiftly or slowly ended is very far from being a matter of indifference. It is never advantageous to prolong this period of crisis: therefore one must act quickly.

Ever since the French Revolution initiated the "wars of peoples," all the resources of the nation have been mobilised when war breaks out. The upkeep of a powerful navy absorbs a very great part of these resources. It is so much taken from the army, and the army, I repeat, is the principal factor. The destruction of the enemy's naval forces would liberate a considerable body of men, material, labour and raw materials, which would be nearly entirely to the direct advantage of the army.

Further, the moral of the people is one of the factors of resistance.

A naval victory would greatly stimulate that moral, while lowering the enemy's.

There are reasons for seeking battle which thus becomes a means of bringing the crisis to an end more quickly.

But, we are told, "the conditions of naval war are such that an enemy cannot be forced to fight . . ."

I refuse absolutely to subscribe to such an opinion. For a long time it was similarly thought that it was impossible to overcome the obstacle of the trenches, and a war of attrition was spoken of. "Don't do anything," it was said, "we shall beat them." But it became necessary to do something, and as it proved impossible to reach a decision without taking up a war of movement, means of overcoming the obstacles were sought, and the obstacles were overcome.

It will be the same at sea as soon as an energetic decision to resolve the problem is made. Just as on land, it will be necessary to employ auxiliary arms (aerial fleet, submarine, long range artillery) to drive the enemy out of his harbours; for it could not be a question of weakening the main fleet in these special operations.

What is more, it might be possible that the help of the Army would be necessary. It was so in the case of the Japanese at Port Arthur. The command of the sea was a vital matter for the Japanese. When Rodjestvensky's voyage was once decided upon, the destruction of the fleet at Port Arthur became a matter of absolute necessity to the Japanese; that is why the army became, at the time, the auxiliary of the Navy.

But how are we to explain the fact that History offers us so few analogous examples?

One could give many reasons. Since a fleet makes its influence felt through the fact of its presence alone, we must admit that there is great temptation to do nothing, and not to run the risks associated with the special operations of driving an enemy from its shelters and engaging him in battle.

Was it not Napoleon who said that one came across very few generals who liked fighting battles? Let us also add that the material means required have hitherto been lacking, and that it is not quite certain that those possessed even by modern navies and armies are adequate.

But I wish particularly to centre attention upon reasons of a political nature.

It must not be forgotten that, in actual fact, it is *the Government* that conducts war—I do not say the operations, but the war. It is the sole judge as to whether all means must be thrown into action simultaneously, and to what limit.

If a nation is battling single-handed for its existence, it can, and generally does, stake its all. What is essential to it is victory in the shortest possible time; for what it loses in strength will be regained in prestige and credit.

But it is a different matter with coalitions. All the partners are anxious enough for victory; but all do not necessarily throw their whole

forces into the struggle, nor in the same way. Although they are making war, they are thinking of " after the war " ; for they know that friendships are not eternal.

When England made use, in the recent war, of the policy of " the fleet in being," we may be sure that she was not unaware that in so doing she was prolonging the war. She could not forget that her Grand Fleet was the sign and instrument of her power in the world. She neither could, nor wished to, appear at the Peace Table with an unduly weakened fleet, insufficient to form a counterpoise to the formidable military power of a victorious France. She would not have refused battle—she wished ardently for it ; but she wanted it in her own waters where the risks were smaller. She did refuse it, as we have seen with our own eyes, when she thought, whether rightly or wrongly, that the annihilation of the German Fleet would cost her too dear.

I am aware that there is the famous letter in which Admiral Jellicoe endeavours to justify in advance his " turn away " for purely military reasons. But I incline to think that these reasons conceal others, and that the Admiral did not initiate them. The short acknowledgment of their reception by the Admiralty, which is at the same time an approval, shows well enough that the naval policy of the Commander of the Grand Fleet agreed marvellously with the general policy of the British Cabinet.

If it was shown that there had been a preliminary understanding, it would be necessary to render homage to Lord Jellicoe's clairvoyance, and also, we must say, to his disinterestedness ; for he did not hesitate to throw his reputation—I was going to say his military honour—into the balance.

To the question " Is the theory of the Fleet in being defensible ? " I will therefore reply :—

From the military point of view, certainly not ; *From the political point of view*, yes ; but this does not concern us, although we cannot ignore it. We ought therefore to put the matter in its complete form. It is not enough to study the battle. The means of digging out an enemy who goes to earth must also be found.

On the question of manœuvre I have little to say : The subject is too vast to be dealt with in a few lines, and I will only touch upon one of the aspects of the matter. Let me declare at once that I take my stand with the partisans of the manœuvre-battle, for the very good reason that inertia has never generated anything but powerlessness.

But having said that, I draw attention to a tendency to limit manœuvre to more or less simple *movements* of forces in line, movements designed to bring about powerful concentration of forces or of fire, which in this case is all one.

" Great successes are attained only by those armies which manœuvre, which succeed in producing a rapid decision by a powerful concentration of force. . . . The manœuvre-battle only employs very simple movements." And when Captain Richard passes to the application of this to Jutland, he does, in fact, move his *Squadrons*.

But why should the auxiliary arms be left systematically out of it? Submarines, torpedo craft, aeroplanes, dirigibles? Manœuvre comprises at least three factors—Surprise, Mass, Speed. Guns are not the only things that can produce mass. And if it is true, as I believe and as Captain Richard writes, that the moral effect of a manœuvre, even if it only achieves its object incompletely, will be more effective than its mechanical effect, let us also make use of submarines, airships, torpedo craft, which will give us an increase in the benefits of surprise.

A certain school would have it that our Navy should consist only of submarines and airships; another considers that those are ridiculous arms for the great task, and wishes to have nothing but large surface ships. As often happens, both schools commit the error of omission.

Ships of the line will always form the backbone of a naval power. If infantry constitutes the principal element in a war of movement, one is not content always to provide large masses of infantry, or large masses of airships or of armoured cars, etc. In the Army *the liaison of all arms* is a dogma. When will it be the same with us?

LIEUTENANT RÉNÉ MARIE.

INFANTRY REQUIRE COVER FROM FLANKING MACHINE-GUN FIRE.

"Infantry Training," Vol. II., 1921 (Provisional), Section 60 (9).

By Bt.-Major C. E. Hudson, V.C., D.S.O., M.C., Sherwood Foresters.

THE above subject has attracted extraordinarily little notice in military circles, and yet it was proved again and again in the last great war that fire, arranged obliquely to the enemy line of attack, is the secret of defence, and, *vice versâ*, is the greatest obstacle to attack. The importance of cross-fire of machine-guns and Lewis guns had not permeated from the expert down to the ordinary infantry officer until early in 1915. In 1915 Inspecting Generals spent much of their time impressing on their subordinates the importance of cross-fire in defence. Moreover, the lesson was rubbed in every time we attempted to attack. In spite of this, it is usually taken for granted that the only value of fire being across the front, rather than straight to the front, is that enfilade fire will produce greater numbers of casualties because the target is a deeper one.

About 1916 our tacticians began to realise that we must not advance in lines. They saw that we could counter machine-gun fire, and more especially oblique machine-gun fire, by advancing in an irregular patchwork of the so-called "blobs." Later on it was said that if the units who are not held up by fire would push on, then those that are held up would soon be able to advance, for the enemy opposing them would be outflanked. From this idea, the theory of "soft spot" tactics arose.

The two points I want to bring out at the moment are :—

(1) that the real value of cross-fire is the fact that the unit it holds up is not the unit concerned in the actual attack on the guns firing, and that therefore the advance of one unit is often directly dependent on the advance of another.

(2) that a "blob" formation and "soft spot" tactics alone will not overcome this difficulty, as the methods advocated as often as not cannot be applied.

"Soft spot" tactics, splendid as they are, increase the likelihood of fire from a flank and therefore increase the necessity for flanking fire being dealt with. In the great war I was held up by direct fire altogether six times. Only on one of these occasions did the majority of the fire come from my own objective, and then lack of numbers prevented us from advancing, rather than the fire. From my own experience, therefore, I maintain that a unit is usually held up by fire from a flank, and not

by fire from its own front. The other occasions were not the result of oblique fire causing more casualties, because we were in open and irregular order each time, and therefore, we were not affected by the fact that the fire was enfilade. No, our real difficulty was that we could not go and attack these machine-guns. We could not leave our own objective and wander across the front of the next battalion. The modern theorist will say that we should have brought covering fire to bear with a portion of our force, while the remainder pushed on. In practice two great difficulties arise. First, it is almost impossible to locate the enemy, who is probably carefully concealed, and perhaps at a distance of about 300 to 800 yards; and, secondly, the enemy has probably chosen or covered his position so that fire can only be brought to bear on him from a position most suitable to himself. There is no question of manœuvre unless the attack is going to be pressed home, which it cannot be. Probably he has a heavy machine-gun fixed on a firm base. His gunners are cool and the gun is unaffected by mud, water, etc., and he has plenty of ammunition. The general confusion and excitement of an advance do not unsteady his aim. As far as a fire-fight alone is concerned, he has so much the advantage of the attacker that he can only be overcome by manœuvre ending in an attack pressed home. On the other hand, perhaps there is cover within reach. The men held up are persuaded to rush for it in small parties, and reach it with perhaps few casualties. Under cover, reorganisation takes place, the advance towards the objective proceeds by a circuitous route. Other units, platoons, companies, or battalions following may get caught here and there in the same way. Some stop where they are for lack of leaders to push them on; some struggle through. When a point of resistance is found actually on the front, our training comes into play, as an attack can be pressed home. Such cases we are prepared for and can deal with. Eventually, either the objective is reached, or too many men are lost, and some strong point cannot be taken unaided. The advance as far as the unit is concerned then dies out. Such is my experience of modern war.

Let us consider the matter from the theoretical point of view, for one man's experience is not sufficient to build on. Both we and other nations realise that cross-fire is the essence of defence. Now, imagine a pair of machine guns firing off, say, 600 yards, to a flank, and covered from the front. Eight times out of ten they will be firing on men of a different battalion from the battalion actually attacking their position, and the odds are heavier still that they will be firing on a different company or platoon. The troops actually attacking them, on the other hand will not even be aware of their existence. What are the leaders of the units fired at, the battalion, company, and platoon commanders, going to do? Superiority of fire is almost impossible to obtain, for the unit commander cannot turn off his proper objective to attack. Imagine the confusion which would result if to do so were the usual practice. Direction and control would be lost from the moment an advance began. There are then two alternatives: (1) to extricate himself as best he can, and

to avoid the fire by use of cover; (2) if he cannot do this, to stay where he is, bringing what fire he can to bear on the enemy, in the hope that the advance of the troops on his flank will clear up the situation. For this to happen, as a rule those troops would have to get well ahead of him before they would come in contact with the enfilading gun, which they could not see. Meanwhile his advance is seriously delayed. Now, suppose that the troops on the flank are waiting for him for the same reason, the delay will then become indefinite. It is in this way that an attack is so often held up.

I will turn again to personal experience for help. In July 1916 I was a Company Commander. I had 500 yards to go over open grass land to reach the first enemy position. We had not got 30 yards when two or three machine-guns started firing at us obliquely from somewhere across a valley about 300 to 400 yards away. We tried using covering fire from Lewis guns, but they were soon put out of action. I went to the telephone to ask for gun-fire. No guns were available, and I was told that an aeroplane would be sent. It came over and gallantly dropped bombs from very low down. I think one machine-gun was put out of action, but we were very little better off, for two were left, and, besides, we had now too few men to hope for much. This, admittedly, was practically trench warfare, but the conditions, as far as we were concerned, were very much open warfare; in fact, far too open. At any rate, here we have two methods employed to compete with cross-fire : infantry covering fire and an aeroplane.

The infantry fire failed, as it usually will under similar conditions, because only by surprise produced by manœuvre can light machine-guns or rifles compete with well protected machine-guns. As far as an aeroplane is concerned, granted that communication is possible, which is unlikely, one cannot expect that each Battalion Commander, much less each Company Commander, will have one at his beck and call. Besides, at present an aeroplane can only rely on a direct hit, for, obviously, it cannot keep the enemy under fire for long. The future may produce an armour-plated aeroplane capable of hovering like a hawk, and keeping its target under a protracted fire; but we cannot wait for that.

On each occasion that I was held up by fire from a flank I found myself unable to gain the mastery with the weapons with which the infantry were armed, except in one instance, the history of which I will now relate. It was during the final advance of the war. I was a Battalion Commander, and my right leading company was held up by some machine-guns on the side of a hill which was on the Americans' front The Americans themselves were held up in a village at the foot of the hill, and on our left rear. Our boundary was marked by a railway embankment which gave fair cover from the hill, and which led up to the only possible line of attack against our own objective. This line of advance was only possible if the guns on the hill were silenced. I had some Stokes guns, and after a good deal of delay in reconnaissance, ammunition carrying, and various necessary arrangements, these guns cleared the hill, and the

attack proceeded. In this case, however, the conditions were ideal for the Stokes guns. As a general rule, I do not think that one can fairly pit a Stokes gun, with its limited range and its great vulnerability, against machine-guns, although their value is immense when the situation is favourable.

During this same final advance a section of field guns was attached to my Battalion Command. The line of advance of my left company lay between two low hills, beyond which was a low-lying ridge. As soon as the company, in open order, cleared the shoulder of the small hill on the right, an enemy post, 300 yards to the right, opened a devastating fire on them. They had no cover and were at a hopeless disadvantage. Some attempted to fire back, but were soon put out of action. Some lay still, and some tried to crawl back to shelter. The enemy were well concealed, and had shown no sign of life until the whole company was exposed. Fortunately I had the gunner officer with me on the hill on the left, and, running back, he brought up a gun, which was finally man-handled, under the cover of a hedge, into a position from which it could fire at the enemy over open sights. The enemy was soon silenced.

The field gun had been successful because it was on the spot, the country suitable, and its officer had used it skilfully. Provided it gets in the first shot, it will wipe out a whole nest of machine-guns. On this occasion it did get in the first shot; but are the occasions when it will, sufficient to warrant a section of field guns being attached to each battalion; and have we enough to spare? I doubt it. The advantage of a forward section being attached to a Battalion H.Q. in certain types of country, is, however, worthy of attention. There must be many occasions in an advance when they cannot be so usefully employed elsewhere, more especially when following a retiring enemy.

I maintain that the infantry could only deal with the situation unaided if they were in a position actually to advance on the enemy. In the two cases already quoted, the probability is that machine-guns and Lewis guns would have failed, where Stokes guns and the field-gun were immediately successful. Also the assault on our own objective would have been to some extent disorganised and weakened by the use of infantry supports, had they been available. The field-gun and Stokes-gun detachments were used purely for covering fire and in flank defence, and their use did not detract from the concentration of infantry force on their own objective.

I will instance one more case in point in which I think the true solution was found. This time it was not the assaulting troops themselves which were held up. In passing, it is worth noting that it is just as likely for the supports or reserves to be held up from a flank as for the leading troops, who are thereby cut off. We are apt to think of actions in parallel lines of attack and defence, whereas, in reality, most attacks in open warfare are made obliquely to the enemy line of defence. The result is that each unit comes into action in advance of the unit on one of its flanks, and is,

therefore, automatically exposed to a flanking fire. Add to this initial exposure of a flank, the desire of the enemy to obtain enfilade fire, and the improbability that alignment will be kept by units, and it will be realised that the flanks of local supports will often be exposed to fire.

My battalion made its attack at dawn. The enemy outposts were overrun with ease, and the enemy main line of resistance proved to be at an angle to our attack. The battalion on the right, therefore, came into action some time before we did. The fact that the enemy in front of us had a short field of fire, and the enemy in front of our neighbours had a long field of fire, added to the distance, that we got ahead of the unit on our right before we came into action. The three leading companies having got well on, I started with my Headquarters and the two platoons in reserve (the companies had been reduced to two platoons each by previous fighting). By this time it was light enough to see at a long range. We had just got down into the valley below our assembly position when some machine-guns which, I suppose, had not seen, or were not in time to fire on our leading companies, opened a heavy fire on us. We began to double, and, after a short distance, lay down. Some gas shells fell amongst us, and gas masks added to our discomfiture. As soon as we lay still, the heavy fire stopped; but when a movement was observed, the fire became intense. The advance was continued by section rushes. The amount of covering fire given to advancing sections was very little. There were a few shell-holes and folds in the ground, which gave sufficient cover for a man lying; but the enemy "had us taped," and, apart from the demoralisation of gas masks and smattering of shrapnel fire, there is no greater strain on a man's courage than to ask him to align his sights on a distant spot from where he presumes the bullets come which are cracking around him. Also, the machine-guns, not being on his front, he is not asked to attack them, and therefore only thinks of avoiding their fire. We were getting on fairly well, and I was taking a breather, when the guns suddenly ceased fire. Two Whippet Tanks had appeared on the scene and the enemy at once ceased firing.

Later in the day, the two platoons which had been with me attacked an enemy post in the corner of a small wood on one front, and took it with great gusto, manœuvring their manœuvre sections with skill, under cover of their fire sections, a fact which I mention to help prove my contention that the same men who will face and take a strong point which they can get at, will not only be demoralised, but often powerless, against fire from a flank.

I afterwards learned that at the far corner of the wood there had been another strong point, which had given much trouble to the units away on our flank. Had I had a Tank, I could have sent it to discover and deal with the strong point, and it could still have returned to me in time to continue to be of use on my own objective. As it was, had I detached infantry, they would never have been back in time to be of use on their own front.

The Tank solution raises two points In the first place, it may be

argued that tanks could deal with the whole problem of attacking strong points, both on the flank and on the objective, and therefore why not dispense with foot soldiers altogether? The other point is that an enemy prepared for tanks would have an anti-tank gun with which to protect himself.

The first point I do not propose to deal with here, more than to point out that if the Army were composed of a fleet of tanks it would be limited to the sphere of tank action—a very serious limitation.

As regards the second point, that of the anti-tank defence, I can only say that if one could produce a method of attack against which there is no defence, war would cease. At any rate, a section or a pair of tanks in the hands of a Battalion Commander, who uses them in offensive action against flank attack, will do more than anything yet suggested to enable the infantry to develop their full strength against the objective allotted to them.

In conclusion, I would emphasize the point that flank defence must be treated as a definite tactical factor, and should be dealt with practically. In defence, cross-fire is a favourite method of meeting attack, and, therefore, the attackers should be prepared to deal with it.

I do not wish to suggest that the infantry cannot attack without a tank, any more than that they cannot attack without artillery, but merely that a common situation, which they find most difficult to overcome unaided, can most easily be met by a tank. Much will, of course, depend on the type of country, but, as a general rule, country in which a tank cannot operate, will be a country in which flanking fire will be difficult to obtain, or else in which there is so much cover that infantry can easily avoid it.

NAVAL NOTES.

GREAT BRITAIN.

Reduction and Economies.

The first quarter of 1922 was marked for the Navy by the drastic recommendations and severe criticisms of the National Committee on Economy over which Sir Eric Geddes presided. The Committee dealt with the Navy in its first report, presented to Parliament on 10th February. The Committee's conclusions were, in brief, that—

> the draft Estimates for 1922–23 provided for man-Power on a lavish scale, that there was an excess of 33,000 officers and men in the Navy, and that a reduction of 35,000 officers and men would be justified;
>
> the Naval Estimates for 1922–23 should be reduced from £81,000,000 to £60,000,000 for that year, and that in the subsequent year still lower estimates should suffice. That a judicious substitution of Air power ought to result in a further reduction of the Navy Estimates.

In these recommendations no account was taken of large savings which might result from the proposals arising out of the Washington Conference.

The Admiralty issued a long and reasoned reply to the detailed criticisms of the Committee, which was subsequently presented to Parliament as a White Paper. The Board's " careful consideration of the Report " led them to two conclusions—

> " That the Board recognize that the report contains several valuable suggestions, some of which the Admiralty themselves brought to the notice of the Committee as being already under consideration, whilst others the Admiralty welcome, and are adopting, but its major recommendations are based on a serious misconception of the character and requirements of our naval organization and the effect upon those requirements of our experience in the late war.
>
> " The very large reduction which the Committee profess to have found possible in the Navy Estimates without affecting naval policy has not actually been found at all."

The Navy Estimates.

The Navy Estimates for the year beginning 1st April 1922 were presented to Parliament on Monday, 13th March, together with explanatory statements by the First Lord of the Admiralty (Cmd. 1603). They showed a total expenditure of £68,950,000 (approximate) gross and £64,883,700 net. The net Estimates for the previous year were £82,479,000, and an excess Vote of £1,632,990 was asked for on 14th March 1922 to make good excess of expenditure over grants. In comparison, therefore, with the total expenditure on the Navy for 1921–22 the Estimates for the coming year show a reduction of £19,228,290. The total number of officers and men is given as 118,500 maximum on 1st April 1922, to be

reduced to approximately 98,500 as soon as possible. The Money Votes are as follows :—

	£ (net).
Wages, etc., of Officers, Seamen and Boys, Coast Gd. and R. Marines	15,822,000
Victualling and Clothing for Navy...	5,827,000
Medical Establishments and Services	529,000
Civilians Employed on Fleet Services	285,000
Educational Services	397,500
Scientific Services	395,000
R. Naval Reserves	552,300
Shipbuilding, Repairs, Maintenance, etc.—	
Section I.—Personnel	7,995,800
II.—Material	7,246,000
III.—Contract Work	3,341,500
Naval Armaments	5,088,800
Works, Buildings, and Repairs at Home and Abroad	4,273,000
Miscellaneous	1,633,500
Admiralty Office	1,387,800
Half pay and Retired pay	3,648,500
Pensions, Gratuities and Allowances	5,326,800
Civil Superannuation, Compensation Allowances and Gratuities	1,134,200
Total	£64,883,700

Detailed Estimates will be presented to Parliament later in the Session.

The First Lord's Memoranda.—In the first of his two explanatory statements Lord Lee of Fareham gave a summary of the economies proposed, or already being effected : (*a*) The scrapping of 12 capital ships, in addition to the eight recently sold for breaking up, and the maintenance of only 15 in full commission (as compared with 38 in March 1914) ; (*b*) The further reduction of the Destroyer Flotillas of the Atlantic Fleet; (*c*) The abolition of 27 Submarines and the reduction of the number in full commission ; (*d*) The abolition of two of the Home Commands (Coast of Scotland and Western Approaches) ; (*e*) The reduction of the *personnel* of the Fleet during 1922–23 by over 20,000 Officers and Men; (*f*) The discharge of over 10,000 men from the Royal Dockyards, and a drastic reduction of Civil Staffs at the Admiralty and other Establishments; (*g*) The rigorous pruning of all other services and Votes.

" As already announced, the building of the four Battle Cruisers which had been sanctioned and commenced last year has now been abandoned and no provision is made in these Estimates for any new programme beyond the laying down, early in 1923, of the two smaller Battleships which are specified in the Naval Treaty concluded at Washington."

In the second statement the economies to be made and the policy to be followed were explained in detail. It showed what vessels were to be scrapped, which would be retained in the Battle fleets and which placed in Reserve. The complement of ships is to be reduced and a saving of £43,000 per annum will be effected in the maintenance of the Royal Naval College at Dartmouth, but the fees for cadets will be increased from £75 to £150 per annum.

Commands and Appointments.

Flag changes announced during the past quarter are not numerous. The appointment of Rear-Admiral Sir Rudolf W. Bentinck, K.G.M.G., to be Commander-in-Chief, Africa Station, in succession to Vice-Admiral SirW. E. Goodenough, K.C.B., will take effect on 12th June. Rear-Admiral A. A. M. Duff, C.B., becomes Rear-Admiral 1st Battle Squadron in place of Admiral Bentinck on 3rd May. Rear-Admiral D. L. Dent, C.B. takes up the appointment of Director of Naval Equipment in place of Rear-Admiral E. F. Bruen, C.B., on 2nd May. Rear-Admiral A. K. Waistell has been appointed to succeed Rear-Admiral Michael Hodges as Rear-Admiral (D) in the Atlantic Fleet. Admiral Sir Charles Madden, Bt., G.C.B. will become First and Principal A.D.C. to His Majesty the King on 15th August in succession to Admiral the Hon. Sir Stanley Colville. Vice-Admiral Sir Arthur Leveson, K.C.B., is to relieve Admiral Sir Alexander Duff, K.C.B., as Commander in-Chief on the China Station on 10th September.

Orders were given in February for the abolition of the appointment of Commander-in-Chief, Coast of Scotland, and for the amalgamation of the Western Approaches Command with that of the Commander-in-Chief, Devonport. In consequence, Rear-Admiral Sir John F. E. Green, K.C.M.G., was appointed Admiral-Superintendent, Rosyth Dockyard, and Commanding Officer, Coast of Scotland, from 1st April, on the termination of the appointment of Admiral Sir Herbert L. Heath, K.C.B. From 1st April the Northern limit of the Plymouth Command was fixed at Bennane Head, ten miles north of Loch Ryan. The Devonport coastguard district henceforward extends from the meridian of 3 degrees west on the south coast of England to Bennane Head, with headquarters at Bristol. The remainder of the Western Approaches command will be transferred to the Plymouth command later.

Rear-Admiral H. T. Buller, C.B., was appointed to the command of His Majesty's Yachts, with his flag in the "Royalist," from 1st April. Captain L. A. B. Donaldson, C.M.G., took over the duties of Director of Torpedoes and Mining at the Admiralty on 1st March. Captain B. St. G. Collard became director of the Gunnery Division of the Naval Staff on 18th April. Captain S. L. Willis became director of the Torpedo division of the Staff on 10th April. Captain A. D. P. R. Pound went to the Admiralty on 19th April preparatory to becoming Director of the Plans Division on 5th May. Important dockyard changes announced during the quarter include: Captain H. N. Garnett, C.M.G., to be captain-superintendent of Sheerness Dockyard, 15th March; Captain the Hon. A. B. S. Dutton, C.M.G., to be captain-superintendent of Pembroke Dockyard and Senior Naval Officer Milford Haven, 4th April; Captain A. C. S. H. D'Aeth, C.B., to be Captain in charge at Portland, 4th April; and Captain H. E. Grace to be Commodore in Charge at Hong Kong.

The appointments of Rear-Admiral, Reserve Fleet, at the Nore, Devonport and Rosyth, terminated on 15th April, and that of Vice-Admiral, Reserve Fleet, will terminate on 15th May. Rear-Admiral E. Hyde Parker is to become Rear-Admiral Commanding Reserve Fleet on 16th May with his flag in the "Courageous" at Portsmouth. The Reserve Fleet divisions at the other ports will thenceforward be under the command of senior captains who will combine the command of their divisions with that of a group parent ship. The appointments of Captain (D) and those of engineer-captains on the Staff of the Rear-Admiral at the outlying posts terminated on 15th April and the duties of engineer-captains transferred to the engineer-commander of the senior group parent ship in each case.

NAVAL OCCURRENCES.

REDUCTION OF PERSONNEL.—Applications for discharge by purchase from all branches of the service except stokers and Royal Marines were invited by a Fleet Order at the end of February. It was announced that priority would be given to applications for discharge on compassionate grounds, that is, those in which it was clear that undoubted material hardship to the man's dependants was involved by his retention in the Service. Flag officers were instructed to forward not more than once in each month to the Admiralty lists of men whose discharge they recommended either as compassionate or ordinary cases, the names to be shown in each list in the order in which release is recommended. Special orders in regard to the discharge of stokers 1st and 2nd Class and Royal Marines were also issued. Free discharges to the number of 1,500 were offered to stokers, and discharge of men under this scheme began on 6th March.

OTHER REDUCTIONS.—The naval sub-depôt at Sheerness was closed down on 15th March and the "Wildfire" establishment closed off. The Naval Sick Quarters there were also closed down. The naval hospitals at Haulbowline and Pembroke were closed down and evacuated on 31st March. On 1st March the local Defence Flotillas at the Home ports were abolished, the vessels forming the flotillas joining the local Reserve. At Devonport two of the destroyers, the "Satyr" and "Tormentor" were ordered to be held ready for emergency service with reduced complements. Similarly at the Nore, the "Redoubt" and "Starfish" are kept ready for emergency service, the rest of the local Defence Flotilla being reduced to Reserve status. The Material Reserve of submarines was ordered at the beginning of March to be abolished. It comprised almost the whole of the remaining vessels of the "E," "G" and "R" types. "H21" and "H51" of the Material Reserve are not to be scrapped pending further orders. The "Actaeon," torpedo school-ship at Sheerness paid off on 31st March.

SIGNAL SCHOOLS.—The Signal Schools at Devonport and Chatham were ordered to be closed down as from 31st January. The whole of the signal training will be carried on at the Portsmouth School. The light cruiser "Yarmouth" has replaced the armoured cruiser "Antrim" as experimental ship attached to the Portsmouth Signal School for wireless work.

THE "VERNON."—Mr. Amery in a letter to Sir Thomas Bramsdon, M.P., announced that the torpedo school hitherto maintained in H.M.S. "Vernon" is to be transferred to the shore owing to the fact that the hulks are in a dangerous condition. The Gunwharf at Portsmouth is to be used for the new torpedo school, and the Mining School, which is already established on the Gunwharf, will be merged in the "Vernon" establishment when the transfer is effected. Captain J. D. Allen, C.B., took over command of the "Vernon" on 6th April.

ATLANTIC FLEET'S CRUISE.—Admiral Sir Charles Madden took the Atlantic Fleet to the Mediterranean in January for exercises and a series of visits to foreign ports. Combined operations were carried out with the Mediterranean Fleet under Admiral de Robeck in the middle of February, and subsequently detachments of the Atlantic Fleet visited Toulon, Villefranche, Ajaccio, Algiers, Oran, Genoa, Naples, Barcelona and Malaga. The whole Fleet reassembled in Spanish waters at the end of March and returned to home ports to give spring leave during the first week of April.

THE "H42" DISASTER.—The Secretary of the Admiralty made the following announcement on 23rd March:—"The following message has been received from the Rear Admiral, Gibraltar: Much regret to report H.M. submarine "H42" was

rammed by H.M.S. "Versatile" about 9.30 a.m. to-day (Thursday), 23rd March, while exercising off Europa Point, and it is feared is totally lost with all hands in 500 fathoms of water." The following day the list of names of 26 officers and men who were lost in the submarine was issued. A memorial service was held on 28th March over the spot where the submarine sank, attended by the Second Division of the First Battle Squadron, the Second Destroyer Flotilla and officers and men of the Third Submarine Flotilla, to which "H42" belonged and of which Lt. D. C. Sealy, her commander, was Senior Submarine Officer. A month earlier a collision occurred off Majorca during exercises, Submarine "H24" being damaged in the conning tower by a surface ship. There was no loss of life.

DOMINION NAVIES.—Captain A. P. Addison, C.M.G., has been lent to the Royal Australian Navy as Commodore commanding the Australian Fleet, and Com. F. H. D. Byron has been lent for other service. The Newfoundland R.N.R., founded in 1898, and assisted by an annual subvention from the Newfoundland Government since 1902, has been ordered by the Admiralty to be disbanded. The training ship "Briton" will be sold. During the war, 1,713 Newfoundland R.N.R. men served in the Navy. The sloop "Ceanothus" which has been presented to the Indian Government for the Royal Indian Marine arrived at Bombay on 11th March, and the companion sloop "Lychnis," which has undergone refit at Devonport, left for India on 19th April.

BATTLE OF JUTLAND CHARTS.—The Duke of Sutherland (for the First Lord of the Admiralty) stated in the House of Lords on 2nd March that much information had been received from German and other sources which had rendered necessary a revision of the track charts of the Battle of Jutland. As originally prepared they consisted of nine charts, showing the tracks at particular times. As a result of further information and in order to elucidate the course of the action more fully, the scope of the work has been considerably extended. The revised charts, showing the positions of the ships at various stages of the action will be about fifty in number, and will be accompanied by a detailed narrative, without which they could not be fully understood. The plans and narrative, when complete, were to be forwarded to Lord Jellicoe for his remarks, and it was hoped that the complete work would be in the hands of the public towards the end of the summer.

PAYMASTER CADETS.—In future the entrance examination for paymaster cadets will be held concurrently with the Army entrance examination. Changes in the syllabus have also been made, details of which can be obtained from the Secretary, Civil Service Commission, Burlington Gardens, W.1. The first examination under the new scheme will begin on 21st November and applications from intended candidates must reach the Admiralty not later than 31st August next.

NAVAL MESSING.—Further reductions in the messing, victualling and provision, etc. allowances were put into force on 1st April. The following are details of the reductions:—Messing Allowance from 11d. to 10d. a day; Victualling, 1s. 10d. to 1s. 8d.; Sunday dinner, 4½d. to 4d. Provision Allowance: for officers, 4s. to 3s. 8d. per day (or £65 to £60 per annum); for men (including long leave allowance), 3s. to 2s. 9d. per day.

COMMISSIONS ABROAD.—The Admiralty have decided that in future the normal length of foreign commissions shall not be less than 2½ years, exclusive of time spent on or awaiting passage, and that time away from home ports is not to exceed three years.

THE WASHINGTON NAVAL TREATY.—Delegates of the Powers attending the Washington Conference signed the various Treaties agreed upon at the Capitol

on 2nd February. The Naval Treaty in its final form differed in many respects from the original proposals put forward by Mr. Hughes at the opening session of the Conference. Limitation of total tonnage was only agreed upon in regard to capital ships and aircraft-carriers. Limitation of size of auxiliary craft was agreed to in regard to cruisers, which are not to exceed 10,000 tons or be armed with guns of more than 8-inch calibre. The numbers of cruisers, destroyers and submarines and other auxiliaries is in no way limited by the Treaty.

SUBMARINES AND GAS.—A further Treaty providing for the limitation of submarine warfare within the accepted rules of warfare at sea and prohibiting the use of submarines as commerce destroyers; and for the prohibition of the use of asphyxiating gases was signed on the same day. Both these Treaties were ratified by the United States Senate on 30th March, but they had not been presented to Parliament in this country for ratification at the end of the quarter.

AIRCRAFT-CARRIERS.—All aircraft-carriers in existence at the time the Conference opened are deemed to be experimental, and may be replaced at any time up to the following agreed limits :—

Great Britain and U.S.	...	135,000 tons each.
Japan		81,000 tons.
France and Italy		60,000 tons (60,960 metric tons) each.

Any of the five Powers may convert into aircraft-carriers not more than two of the half-completed capital ships ordered to be scrapped under the Treaty, provided that the tonnage does not exceed 33,000 tons each. New construction in aircraft-carriers shall not exceed 27,000 tons, and no vessel of this type shall carry a gun heavier than 8-inch.

FOREIGN NAVIES.

FRANCE.

NEW ESTIMATES.—The naval programme was passed by the Senate on 16th March by 197 votes to 96. The Minister of Marine is authorised to lay down during 1922 three light cruisers, six destroyers, twelve torpedo boats and twelve submarines. The conversion of the half-built battleship " Bearn " into an aircraft-carrier is also to be started. The gunboats " Moqueuse " and " Malicieuse " are to be transferred to Saigon for sea-police and hydrographical duties.

UNITED STATES.

REDUCTIONS.—Mr. Denby, the Secretary of the Navy, in a statement to the House Committee on Naval Affairs on 13th February announced that the Department was prepared to reduce the personnel to 90,000 men and 6,000 officers. He further stated that he would immediately order the putting out of commission of one hundred destroyers and their accompanying tenders, and this was done in the course of the ensuing week.

JAPAN.

In consequence of the Washington Treaty, the Council of Marshals and Admirals decided, on 25th March, to reduce the Japanese cordon of defence to a much narrower limit, the operative range of the Fleet being confined to an area nearer than hitherto to its base.

MILITARY NOTES.

REPORT OF THE GEDDES COMMITTEE.

The First and Second Interim Reports of the Geddes Committee were issued on 10th February last in the Form of Blue Books. The terms of reference were: "To make recommendations to the Chancellor of the Exchequer for effecting forthwith all possible reductions in the National Expenditure on Supply Services, having regard especially to the present and prospective position of the Revenue. In so far as questions of policy are involved in the expenditure under discussion, these will remain for the exclusive consideration of the Cabinet; but it will be open to the Committee to review the expenditure and to indicate the economies which might be effected if particular policies were either adopted, abandoned, or modified."

In their introductory remarks on the Navy, Army, and Air Force Estimates the Committee say:—

We have come to the conclusion that the cost of the defence of the Empire, so far as it falls upon the British taxpayer, must be considered as a whole. The necessity for this is much more apparent now than it was before the war, more especially because of the advent of the Air arm, which has come so much to the front, either as an addition to the older fighting services, or in substitution for them.

The following figures show the growth of expenditure under the heading of defence generally:—

Total Estimates.—(Figures are net, and exclude terminal war charges for 1922–23. The figures relating to these charges are not available for the Navy, but they are negligible. Army total, £2,937,000. Air, £504,900.)

(000's omitted in following Table.)

——	1914–15.		1922–23.	
	£	£	£	£
(i) Navy	—	51,550*	—	81,183*
(ii) Army	28,845	28,845	64,197	75,197
Middle East	Nil		11,000	
(iii) Air	,,	Nil	12,452	14,173
Middle East	,,	,,	1,720	
Add, value of stores consumed from stock	—	—	—	5,134
Total	—	80,395	—	175,689

* Including new Naval construction: 1914–15, £15,628,257; 1922–23, £14,644,000.

These figures show an increase of upwards of £95,000,000 per annum.

The personnel of the Fighting Services has risen from 333,000 in 1914–15 to nearly 362,000 in 1922–23, and whilst increasing in personnel the Fighting

Services have enormously increased in effectiveness by the addition of new arms and improved instruments of war.

Increase in Fighting Power.—We must record a very marked impression derived from long conference with the departmental representatives of the three Fighting Services. The estimates provide that in the year 1923, the fifth year after the Armistice was signed, with a broken and exhausted Europe and with no German menace, we are to have far greater fighting power, with a larger personnel, and greater preparations for war than ever before in our history. Additional services, more deadly weapons, additional systems are added to the old formations or to the old units. Apart from our detailed proposals for economy, we are of opinion that the estimates for the defence of the Empire lack co-ordination, and we have been forced to the conclusion that until that co-ordination is attained, overlapping and wasteful expenditure is inevitable.

In our opinion full economy in the Fighting Services cannot be realised under existing conditions. There is overlapping and duplication throughout. In order to fully realise these economies the three Forces must be brought together by the creation of a Co-ordinating Authority or a Ministry of Defence responsible for seeing that each Force plays its part and is allotted appropriate responsibility for carrying out various functions. The theory of such a Ministry in embryo appears already to exist in the Committee of Imperial Defence. With the creation of a Co-ordinating Authority or Ministry of this description it would be possible to ensure that corresponding reductions in expenditure were realised when either of the older Services was relieved or assisted, and no additional expense or extra Ministerial appointment need, in our opinion, be involved, as the Minister and his staff could all be drawn from existing organisations. All the arguments of an economic character which have been urged for the absorption of the Air Force into the two older Services apply, in our opinion, also to the fusion of all three Services under one Minister. Complete co-ordination in Supply, Transport, Education, Medical and other Services would then be possibble.

We attach great importance to a settlement of this question in the interests of economy.

The provisional Army Estimate which has been presented to us for 1922–23 compares with the 1914–15 figure, after the Aviation expenditure for that year is deducted, as follows :—Net Estimate—1914–15, £27,845,000 (excluding £1,000,000 provided for Aviation); 1922–23, £78,134,800. (*Less*, £2,937,000 for aftermath charges.) It will be seen that we are to-day considering Estimates for an Army, including the Middle East, approaching three times the Estimate of 1914–15.

As regards the numbers in the Army, comparing 1922–23 with 1914–15, the comparison may be taken as follows :—

	1914–15 (excluding R.F.C.).	1922–23.
All ranks, British, native, and Colonial troops	181,000	210,000

(These figures are exclusive of British troops stationed in India and paid for by that country. The numbers of these for 1914–15 are 75,824, and 1922–23, 70,980, so that there is a material increase both in cost and numbers, and this applies both to officers and men, and to British as well as to native troops.)

We have considered the nation's overseas obligations as far as possible. The following table shows the garrisons for 1914–15, and the garrisons covered by the

Estimates for 1922–23, together with the Committee's suggestions thereon, which are amplified in the following paragraphs:—

	Cavalry Regiments (including 3 of Household Cavalry).		
	1914.	1922–23.	Committee's Suggestions.
Indian Establishment	9	8	8
Foreign and Colonial Establishment—			
Aden*	—	—	—
Mesopotamia	—	1	1
Palestine	—	3	2
Egypt†	1	1	1
Constantinople	—	1	—
Gibraltar†	—	—	—
Malta†	—	—	—
South Africa	2	—	—
Mauritius	—	—	—
Bermuda	—	—	—
Jamaica	—	—	—
Ceylon	—	—	—
Singapore	—	—	—
Hong Kong	—	—	—
North China	—	—	—
Total, Foreign and Colonial ..	3	6	4
Total abroad (including India) ..	12	14	12
Home Establishment—			
Germany	—	1	1
United Kingdom	19	12	6
Total Units	31	27‡	19
		Reduction 8 Regiments.	

	Infantry Battalions (including 10 of Foot Guards, 9 in 1914).		
	1914.	1922–23.	Committee's Suggestions.
Indian Establishment	51	45	45
Foreign and Colonial Establishment—			
Aden*	1	1	1
Mesopotamia	—	2	2
Palestine	—	2	1
Egypt†	5	7	6
Constantinople	—	2	2
Gibraltar†	2	2	1 (Guards)
Malta†	5	4	2 "
South Africa	4½	—	—
Mauritius	½	—	—
Bermuda	1	½	½
Jamaica	—	½	½

	Infantry Battalions (including 10 of Foot Guards, 9 in 1914).		
	1914.	1922–23.	Committee's Suggestions.
Ceylon	—	1	½
Singapore	1	2	½
Hong Kong	1	1	½
North China	2	2	½
Total, Foreign and Colonial ..	23	27	18
Total abroad (including India) ..	74	72	63 (3 Guards)
Home Establishment—			
Germany	—	8	—
United Kingdom	83	78	67 (7 Guards)
Total Units	157	158	130
		Reduction 28 Battalions.	

NOTES.—*Aden, formerly on the Indian Establishment, is being transferred to the Middle East.

† At these stations a small reserve for eventualities in the Middle East or elsewhere is provided in addition to the requirements of purely local defence.

‡ The reduction of 4 regiments, from 31 to 27, has already been announced but not yet carried out.

As shown above, India has relinquished a cavalry regiment and six infantry battalions, and South Africa and Mauritius have relinquished five infantry battalions and two cavalry regiments. The War Office have, upon demobilisation, 1 extra infantry battalion, giving them in their own hands 12 additional infantry battalions in all, and these they have retained. These 12 infantry battalions they propose to use in the following way :—

6 in Mesopotamia, Palestine, and Constantinople.
2 additional in Egypt.
1 at Singapore.
3 in the Home Establishments. (Germany is regarded as in the Home Establishments.)

The nine battalions abroad mean, under the "Cardwell system," nine link battalions at home and nine depôts.

It will therefore be seen that the reduction of 11 battalions in India and Africa not only affords no relief to the taxpayer, but increases his burden, because the 6 battalions from India were paid for by India, and are now transferred to the British taxpayer.

We suggest that this should be done—

1. By withdrawing battalions abroad;
2. In view of the increased fire-power by providing garrisons of half a battalion instead of a full battalion;
3. With His Majesty's approval, by sending certain Guards battalions temporarily to the nearer Foreign Service stations;
4. By employing native troops in the place of British troops;

and finally, if these reductions do not prove sufficient, by abandoning or modifying the Cardwell System.

It is difficult for us to recommend authoritatively detailed adjustments in garrisons, but we venture to make the suggestions which are shown in the table above :—

1. Over and above the infantry forming the British Expeditionary Force of six divisions, with its four battalions for lines of communication, for which the Estimates provide, there are also four surplus British infantry battalions at Home which might be disbanded.
2. Three battalions of the Guards might be sent to Malta and Gibraltar, relieving three line battalions for disbandment, together with their linked battalions at home, which would make six battalions, with their three depôts.
3. Two of the four infantry battalions proposed for Malta and one of the two battalions proposed for Gibraltar might be reduced, which, with their linked battalions and depôts, would make a total of six battalions and three depôts.
4. Two of the nine battalions in Egypt and Palestine might be reduced, giving a reduction of four battalions with two more depôts.
5. As there appears to be no military reason for stationing two infantry battalions in North China in 1922–23 as proposed, the omission of these would give a reduction of four battalions and two depôts.
   (We are advised by the Foreign Office that under the Protocol of 1901 there are now only 300 British white troops acting as Legation Guard at Peking.)
6. The three battalions proposed for Singapore and Ceylon might be reduced to half a battalion at each place, or alternatively, native troops might be employed. The reduction in this case would be four battalions and two depôts.

The total result of the above suggestions would be a reduction in the strength of the Army of 28 battalions and 12 depôts.

Taking all branches of the Army, the ratio of officers to men before the war was 1 to 17, whereas now the ratio is as 1 to 14. These figures, when translated into numbers, indicate that the Army now has 2,313 more officers than it would have if the pre-war ratio between officers and men had been maintained. The increased ratio of officers involves the taxpayer in more than £1,000,000 per annum. The increase in officers flows right through, from the Infantry regiments to the highest Command Staffs, and, just as we think that the addition of a Signal Corps or a Tanks Corps should justify itself and the increased efficiency of the fighting machine by a reduction in cost, so we think that the increased establishments of officers through the Army can only be justified if there are corresponding reductions in cost in other directions.

Staffs and Commands.—In the United Kingdom there are seven principal Commands, namely, Aldershot, Eastern, Northern, Southern, Western, Scottish, Irish. The total staff of these Commands at Home and at Defended Ports is 963, as compared with 936 before the war, but there has been a very large increase in the staffs abroad. The staff in Egypt has increased from six to 73 (including Palestine), and in addition we now have a staff of 58 officers on the Rhine, a staff of 115 officers at Constantinople, a staff of 87 officers at Iraq, and a staff of 92 officers and 121 other ranks employed on missions in various capitals of the world.

With so much of the Army out of England, we cannot but think that a careful scrutiny would enable the Home staffs to be cut down in order largely to provide for the overseas requirements. We consider that a careful enquiry would show how valuable reductions in thise staffs, both at home and abroad, could be effected.

War Office Staff.—The total staff of the War Office have increased from

1,878 to 4,114, but of these 560 are still required in connection with the distribution of medals, leaving a total increase of 1,676. The increase is general throughout. One of the principal reasons given appeared to be the increase of domestic military correspondence, and, in our opinion, as there is an increase of clerical staff in all the Commands, the way to stop this correspondence is to reduce the staff which creates it. The Army is little bigger than it was in 1913–14, and apart from those engaged in the issue of medals, we consider that the War Office Staff should be capable of considerable reductions, and during next year its numbers should, apart from the issue of medals, approximate to pre-war numbers.

As evidence of the possibility of a reduction in the Estimates, we may say that since our meeting with the War Office they have indicated that a reduction in the Estimates for one Branch alone of £196,000 is possible, equivalent to 37.5 per cent. of the cost of that Branch. The total Estimates for the War Office for the year 1922–23 are £1,334,000, and this compares with £457,000 before the war.

Militia.

The provision in the Estimates for this force is £1,500,000, as compared with £260,000 in the current year. If it is recruited, the cost will increase to £2,750,000 per annum, as compared with slightly over £1,000,000 for the Special Reserve of pre-war days.

We are of opinion that the necessity for recruiting this force at the present time should be further considered, as, in the event of an emergency arising, there exist large numbers of men in the civilian population who have had a thorough training in arms.

Territorial Force.

Provision for this force in 1922–23 is slightly under £5,000,000. This was for an establishment of 192,000; in actual fact, the strength is only 138,000, but the War Office anticipate that this shortage will not produce any reduction in 1922–23 owing to the initial expense in connection with the formation of the force. The cost per head in 1914–15 was £13 2s. 3d., whereas the estimated cost for next year is £30 5s. 3d. The permanent divisional and regimental staffs are practically maintained at pre-war numbers and the cost of them to-day is £1,135,000, and even with projected reductions, will cost nearly £1,000,000, with a smaller number of men.

With no immediate prospect of war, and therefore with a much more slender prospect of invasion of these islands, we are of opinion that the whole of the permanent staff for the Territorial Force should be reviewed, and that the expenditure on staff should not exceed £500,000 per annum. Aerial attack must be one of the principal considerations of the future, and we suggest that the Territorial Force, in so far as it is cast for the defence of these islands, cannot be considered without considering at the same time the problem of defence against aerial attack. If the Cabinet see fit to adopt our suggestion as to the creation of a Minister of Defence, this is one of the questions which would undoubtedly be considered by that Minister when created.

Analysis.

We have now dealt with the Army Estimates in two main directions. We have suggested that by limiting our overseas garrisons, and reducing the corresponding units at Home, a great reduction could be made in the size of the Army. We have also dealt with a limited number of instances where we think economies could be made. The economies we have suggested are by no means exhaustive nor do they represent a complete review of the whole of Army expenditure. We

do not doubt that further study on these lines would reveal the possibility of many additional economies.

In order to test whether, on the whole, the man-power is economically employed, we have made the following calculations :—

PRE-WAR ESTIMATES, 1914–15.

Force abroad	108,928
80 per cent. for relief and drafting units at home	87,143
Total	196,071
Add one-seventh for recruits	28,010
Total requirements for maintenance of forces abroad	224,081
Additional personnel at home for other purposes	24,560
	248,641

ESTIMATES FOR 1922–23.

——	Peace Requirements.	Additional for Abnormalities.
India	63,896	7,084
Rhine	—	10,262
Egypt (pre-war)	6,214	4,679
Constantinople	—	2,584
Palestine	—	5,473
Iraq	—	5,185
Colonial and other garrisons abroad, missions, &c.	16,348	—
Total abroad	86,458	35,267
80 per cent. for relief and drafting units at home	69,166	—
Total	155,624	—
Add one-seventh for recruits	22,232	—
Total requirements for maintenance of forces abroad	177,856	—
Additional personnel at home on pre-war basis ..	24,560	—
Total	202,416	—
Additional personnel provided in 1922–23— Estimates over peace requirements	54,429	—
Numbers estimated for	256,845	—

The question that we have to ask is how the additional and abnormal demands of 35,000 are to be met, and why there is an excess of 54,000 on the Estimates?

We think it not unreasonable that a very large portion of the additional and abnormal demand for 35,000 men should be met either from the 96,000 men in line units at home, or from the 24,000 additional personnel at home on the pre-war

basis, which include the whole of the Guards battalions. If this fails to find the men needed, we suggest that the foreign garrisons, which take up 16,348 men, should be resorted to, and that the recruit course be curtailed for the present.

The 54,000 additional troops provided in the 1922–23 Estimates for the theoretical peace requirements are accounted for as follows:—The War Office has asked for a money provision for 14,000–20,000 men more than they believe they can enlist, and therefore the excess is brought down to something under 40,000. In addition, there is the great increase of new corps, additional officers and men on the Staff, Schools, Training, and so forth.

This calculation appears to us to confirm our view that the staffing and use of the man-power in the Army to-day is on a far less economical basis than it was before the war, and that in addition to anything that the Government may see its way to do in the direction of reducing battalions abroad and link battalions at home on the lines of the first portion of this Report, they should also require the Army to reduce very materially the Estimates for personnel.

We are convinced from our survey of the War Office Estimates that there is great room for economy in men and money without in any way endangering the defence of the Empire.

CONCLUSIONS.

As a result of our consideration, we are of the opinion:—

1. That man-power has been estimated on a lavish scale for 1922–23, and that a reduction of 50,000 officers and men could be made without in any way reducing the forces employed by the War Office on foreign service.
2. That the introduction of new arms and corps, and of the Air Force, which have been created with the object of increasing the fighting efficiency of the defence forces of the Empire, is not reflected in corresponding reductions in other directions, and that savings could be made on that account.
3. That there has been an increase in all the ancillary and auxiliary services of the Army which the country cannot afford and in which drastic economies should be made.
4. That the abnormal reserve of mobilisation equipment and arms now held is costly to store, guard, and maintain, and that the effect of holding it results in heavy additional indirect cost.
5. That the Army Estimates for 1922–23 should be reduced from £75,197,800 to £55,000,000 for that year, and that in the subsequent year still lower Estimates should suffice.

In this recommendation no account is taken of possible further reductions resulting from a review by the Government of our military requirements at Home and abroad, normal and abnormal.

No account has been taken of any reduction in pay and allowances which the Government may decide to make, and no account is taken of any abnormal increase in the Non-Effective Vote, caused by a reduction of personnel transferred to the Retired List, with both of which items we deal separately in a later Report.

ARMY REDUCTIONS.

With the issue of the Army Estimates on 13th March last there was also published the reply of Sir L. Worthington-Evans (Secretary of State for War) to

the recommendations of the Committee on National Expenditure, presided over by Sir Eric Geddes, and the action which it is proposed to take on them.

The money asked for the Army shows a reduction of £31,414,000 on the previous Estimates. The Estimates for the two periods are set out below :—

1922–23.	1921–22.
£62,300,000	£93,714,000

The three items which compose the new Estimate are :—

(*a*) Normal current charges for the Army	£51,750,000
(*b*) Charges arising out of the reductions in the Army, including compensation to officers and men whose services are prematurely dispensed with	3,550,000
(*c*) Terminal charges of the war	7,000,000
Total	£62,300,000

The reduction in the total number of officers and men to be voted is seen from the following table :—

1922–23.	1921–22.
215,000	341,000

The chief reductions are as follows :—

——	1922–23.	1921–22.
Total Regimental Establishments	145,724	191,532
Permanent Staff, Territorial Army	2,246	2,959
Staff and Departments	1,441	2,463
Colonial and Native Indian troops	10,200	84,200

Details of the Decisions reached.—Sir L. Worthington-Evans gave in tabular form a detailed statement of the Committee's recommendations and the proposed action thereon. The following are the more important of the decisions reached :—

To reduce the Regular Army (British troops) by—

5 Line Cavalry regiments (or an equivalent reduction),
24 Line Infantry battalions and corresponding depôts,

with Artillery, Engineers, Signals, Army Service Corps, and other arms, totalling about 33,500 officers and men below the sketch estimate of 186,400 laid before the Committee, thus reducing the numbers of British troops on Vote A of the Army Estimates to about 152,800, as compared with 172,800 in 1914 and 201,000 in the Estimates of 1921–22.

Seven battalions to be withdrawn from foreign garrison duty, instead of nine recommended.

One Guards battalion to serve abroad temporarily instead of three recommended.

The London District will be merged in the Eastern Command for administrative purposes. The Irish Command will disappear, Ulster becoming an area command of Great Britain.

The staff of the War Office is being rapidly reduced.

Woolwich and Sandhurst fees to be raised to £200 for sons of civilians; fees for sons of officers in proportion.

Central Gas School to be closed.

"Research being more essential in view of the reduction of the Army, the Vote for this subject cannot be reduced below £1,040,000."

In addition to complete equipment for five divisions and one Cavalry division, it is proposed to hold certain war stores for a further number of divisions, at an extra cost not exceeding £200,000 a year. "The stores in question, which are highly technical, are all in hand, would take many months to manufacture on the outbreak of war, and would realise very little if sold."

It is intended to adhere to the decision to retain Waltham Abbey, for reasons of national safety.

The establishment of horses will be reduced from 33,000 to about 25,000.

The formation of the Militia (largely technical) is necessary for mobilisation purposes, and in view of its being available for duty in time of internal disorder.

The War Secretary's Memorandum is published as a White Paper, Cmd. 1604. (H.M.S.O., 3d.)

Cavalry Regiments.

Amalgamation Plan.—It is officially announced that the King has approved of the reconstitution of the four cavalry regiments whose disbandment was provided for in an Army Order published in July, 1921—namely, the 5th Royal Irish Lancers, the 19th Royal Hussars (Queen Alexandra's Own), the 20th Hussars, and the 21st Lancers (Empress of India's).

His Majesty has also approved of a reduction in establishment of the cavalry as a whole, equivalent to one regiment of Household Cavalry and eight regiments of cavalry of the line, as soon as the exigencies of the Service permit. These reductions will be effected as follows:—

The 1st and 2nd Life Guards will form one regiment of four squadrons, to be designated 'A,' 'B,' 'C,' and 'D' Squadrons. The first two squadrons will be provided by the 1st Life Guards, and the second two by the 2nd Life Guards, and the composite regiment will be named 'The Life Guards.' A further reduction of two Hotchkiss troops each will be made in the Royal Horse Guards and the Life Guards.

Regiments of the cavalry of the line will be amalgamated as follows:—

3rd Dragoon Guards	2 sqdns.	To form
The Carabiniers	1 sqdn.	3rd/6th Dragoon Guards.
4th Dragoon Guards	2 sqdns.	To form
7th Dragoon Guards	1 sqdn.	4th/7th Dragoon Guards.
5th Dragoon Guards	2 sqdns.	To form
The Inniskillings	1 sqdn.	5th/6th Dragoons.
13th Hussars	2 sqdns.	To form
18th Hussars	1 sqdn.	13th/18th Hussars.
14th Hussars	2 sqdns.	To form
20th Hussars	1 sqdn.	14th/20th Hussars.
15th Hussars	2 sqdns.	To form
19th Hussars	1 sqdn.	15th/19th Hussars.
16th Lancers	2 sqdns.	To form
5th Lancers	1 sqdn.	16th/5th Lancers.
17th Lancers	2 sqdns.	To form
21st Lancers	1 sqdn.	17th/21st Lancers.

A composite regiment of the cavalry of the line will be treated for all purposes as a complete regiment, but each of its three squadrons will retain the name of its regiment of origin in order to preserve the identity of the latter.

In determining which cavalry regiments should be selected for amalgamation, the Army Council has proceeded on the principle of distributing the incidence as equally as possible over the three corps of Dragoons (including Dragoon Guards), Hussars, and Lancers, the last-raised regiments in each of the corps being selected for amalgamation. In this connection it may be pointed out that the Royal Dragoons and Royal Scots Greys were raised earlier than any other regiments of their corps, although they are shown in more junior positions in the Army List. The regiments have been dealt with on a corps basis, since, had the last-raised regiments of the cavalry as a whole been selected for amalgamation, this would have resulted in the reduction of establishments of all the Lancers and all but two Hussar to the entire exclusion of the Dragoons and Dragoon Guards.

Corps and Battalions to be Disbanded.—It has been officially announced that the King has approved, with great regret, the disbandment, as soon as the exigencies of the Service permit, of the following corps and battalions of Infantry of the Line :—

Royal Irish Regiment, comprising 1st Batt., 2nd Batt., 3rd Batt. (Militia), 4th Batt. (Militia), Depôt.

Royal Irish Fusiliers (Princess Victoria's), comprising 1st Batt., 2nd Batt., 3rd Batt. (Militia), 4th Batt. (Militia), Depôt.

Connaught Rangers, comprising 1st Batt., 2nd Batt., 3rd Batt. (Militia), 4th Batt. (Militia), Depôt.

Prince of Wales's Leinster Regiment (Royal Canadians), comprising 1st Batt., 2nd Batt., 3rd Batt. (Militia), 4th Batt. (Militia), 5th Batt. (Militia), Depôt.

Royal Munster Fusiliers, comprising 1st Batt., 2nd Batt., 3rd Batt. (Militia), 4th Batt. (Militia), 5th Batt. (Militia), Depôt.

Royal Dublin Fusiliers, comprising 1st Batt., 2nd Batt., 3rd Batt. (Militia), 4th Batt (Militia), 5th Batt. (Militia), Depôt.

3rd and 4th Batts., Royal Fusiliers (City of London Regiment).

3rd and 4th Batts., Worcester Regiment.

3rd and 4th Batts., Middlesex Regiment (Duke of Cambridge's Own).

3rd and 4th Batts., King's Royal Rifle Corps.

3rd and 4th Batts., Rifle Brigade (Prince Consort's Own).

New Chief of Imperial General Staff.—General the Earl of Cavan, K.P., G.C.M.G., K.C.B., M.V.O., A.D.C.General, who became the new Chief of the Imperial General Staff when Field-Marshal Sir Henry Wilson, Bt., G.C.B., D.S.O., vacated that post on 19th February last, joined the Grenadier Guards in 1885 and retired from the Army in 1913. When war broke out he was recalled, and in September, 1914, went to France in command of the 4th Brigade. In June, 1915, he was promoted Major-General in command of the 50th Division, and was transferred in August to the Guards Division. In January, 1916, he became Commander of the 14th Corps, and from March, 1918, to January, 1919, he was G.O.C.-in-C. the British Armies in Italy. From March to November last year he was Lieutenant of the Tower of London, and has since then held the Aldershot Command. Lord Cavan was promoted General on 1st November, when about to leave for Washington as head of the military members of the British delegation. He was born in 1865.

ROYAL AIR FORCE NOTES.

I.—RECENT OPERATIONS.

IRAQ.

January.—No. 70 Squadron Vickers Vernon Troop Carriers moved by air from Egypt to Baghdad.

Bombing operations were carried out in the Sulaimaniyah District, as the result of a severe attack on a force of Levies by tribal bodies in the vicinity of Khurnal. These tribes were subjected to bombing from the 15th to the 19th January including night bombing on the night of the 16th January, the situation being completely restored. In the Basrah district, the Sarkals of the Aiwan and Badran sections of the Madinah tribes were bombed on the 10th January, as a result of their continued refusal to pay rent and revenue. On the morning of the 17th they surrendered unconditionally.

February.—No bombing operations were carried out by the Royal Air Force, but many reconnaissance and demonstration flights were carried out.

The aerial route between Baghdad and Cairo was re-marked by a convoy of two Crossley Tenders and two Ford cars which left Baghdad on 18th February; the convoy was refueled by aircraft at various landing grounds on route.

March.—Bombing operations were undertaken on 6th March against certain sections of the Suq tribe with complete success; the leaders of the recalcitrant sections surrendering immediately.

On 14th and 15th March bombing operations were undertaken against Arkwan tribesmen who had attacked friendly tribes south of Nasiriyah. The raiders were driven back across the Iraq border. One of our machines was brought down by rifle fire, but the pilot and observer walked back to safety.

On 21st March the High Commissioner for Iraq visited Fahad Beg Sheikh of Amaret, 30 miles to the N.W. of Hit, by air with an escort of 12 machines.

On 31st March the High Commissioner, King Feisal and Staff were conveyed by a formation of 14 machines to visit Ali Sulaiman, Sheikh of Dulain at Ramadi.

ADEN.

February.—On the 1st and 2nd February bombing operations were initiated against raiders who had invaded the Haushabi country. Heavy casualties were inflicted on the raiders who revealed themselves by opening fire on the machines. The enemy were routed and retreated in the utmost disorder, pursued as far as possible by the machines.

SOMALILAND.

March.—On 25th February, Captain Gibb was shot dead by insurgents during an affray at Burao. The Governor of Somaliland requested that two aeroplanes should be sent from Aden to deal with the trouble. On 1st March two machines left Aden for Berbera *via* Perim, arriving on 2nd March. Meantime the insurgents had been notified that the leaders must surrender and a considerable fine be paid, otherwise air action would be taken against them. Aeroplane demonstration

was carried out on 4th March and 5th, with the result that the Governor's conditions were complied with; actual punitive measures being unnecessary.

INDIA.

January.—On the 12th January bombing operations were undertaken against a camp situated in Gharosti Nullah, 10 miles N.N.E. of Dardoni.

MEDITERRANEAN.

Long distance flights have been carried out by flying boats as follows :—

January.	Malta	to	Bizerta and return.
	,,		Naples ,,
February.	,,		Palermo ,,
	,,		Tripoli ,,
March.	,,		Athens ,,

In all cases the flying boats were moored for the night and the crews slept on board.

II.—FOREIGN AVIATION.

FRANCE.

Air Estimates.—The following sums have been voted by both Houses of Parliament for the Naval, Military, Colonial and Civil Air Services, for the fiscal year ending 31st December, 1922. For purposes of comparison the sums voted for 1921 are also shown :—

	1921.	1922.
Army Air Service	Frs. 257,315,180	252,150,202
	£ at par 10,292,607	10,086,008
Naval Air Service	Frs. 33,807,300	37,318,543
	£ at par 1,352,292	1,492,741
Colonial Aviation	Frs. 6,590,864	7,081,864
	£ at par 263,634	283,274
Civil Aviation	Frs. 147,401,512	147,210,970
	£ at par 5,896,060	5,888,438

Anti-Aircraft Defences.—As from 15th January the control of the French Anti-Aircraft Defences was transferred from the Director of Military Aeronautics to the Director of Artillery.

Air Attachés.—As a result of the reduction of the sums required by the U.S. of S. for Air for the cost of Air Attachés in foreign capitals, those at Peking, Tokio and Buenos Aires have been withdrawn. The Assistant Military Attaché acting as Air Attaché at Stockholm has also been recalled. There are six officers now representing French Aeronautics abroad, of these four are to be temporarily retained as Air Attachés. These are as follows :—

Air Attachés :	London	(paid by the Ministry of Marine).
	Rome	(paid by the U.S. of S. for Air).
	Madrid	,, ,,
	Bucharest	,, ,,
Assistant Military Attachés :		
	Washington (Formerly Air Attaché).	
	Brussels.	

NAVAL AVIATION.

Director of Naval Aeronautics.—Vice-Admiral A. M. R. Lanxade has been appointed Director of Naval Aeronautics at the Ministry of Marine vice Capitaine de Vaisseau Valdenaire.

Aircraft Carriers.—In the course of the debate on the Naval programme in the Senate it was stated that the conversion of the aircraft-carrier " Béarn " would take two more years and cost frs. 60,000,000. The Finance Committee do not consider that this sum is too high and the work will proceed.

Airships.—As a result of the refusal by the Chamber to vote sums to cover the cost of establishing an airship route from Marseilles to Algiers, the airship " Méditerranée " (ex-German " Nordstern ") which was to have been used on this service will shortly be handed over to the Navy.

UNITED STATES OF AMERICA.

Air Estimates.—The Budget for the fiscal year ending June, 1923, contains the following amounts for the Air Services :—

Army Air Service $15,000,000 (£3,000,000 at par rate of $5 to £1).
Naval Air Service $17,000,000 (£3,400,000 at par rate of $5 to £1).

A general re-organisation of the Army Air Service is taking place to meet the reduced appropriation of the fiscal year 1922–23 which will result in a material reduction of the number of effective machines in use. It should be noted that this is the first year that the Naval Air Service Estimate has exceeded that of the Army Air Service.

Training.—A certain number of Army officers are being posted to the Naval Air Station, Pensacola, Florida for courses of instruction in flying seaplanes and in the co-operation of land and sea air units.

CANADA.

Canadian Air Force.—The reports which have appeared in the press that the Canadian Air Force is being re-organised and will cease to be a separate force, are officially denied. At present there is no intention of allowing the Canadian Air Force to be absorbed by the Army.

GERMANY.

A society, known as the ' Ring der Flieger,' has now been formed in Germany. The purpose of this association is to enrol and keep in constant touch with all ex-pilots and ex-airmen, to keep alive the spirit and traditions of aviation during the war, to publish a journal giving the latest developments in aviation at home and abroad, and, in case of necessity, to render assistance to those members who may find themselves in needy circumstances.

General von Hoeppner and Colonel Siegert, respectively Chief of the Air Force and Commander of the Air Force on the Western Front during the war, hold prominent positions on the advisory committee.

The fact that as far as possible each link which forms the ' Ring ' is to consist of the combatants who served together in one squadron or unit, coupled with the violent invective used by the chief speaker at its opening meeting, shows that the future activities of the society will probably be directed towards keeping in being, though in a disguised form, an Air Force imbued with the ideals of the old one.

No entrance fee or subscription is asked for from the members. This may indicate that strong financial and industrial interests, if not the government, are offering their support.

The following air mail services were resumed on the 3rd February :—

(*a*) Berlin to Hamburg.
(*b*) ,, Dortmund.
(*c*) ,, Bremen.
(*d*) Berlin to Stettin.
(*e*) ,, Dresden.

The Conference of Ambassadors having declared the air disarmament of Germany to be complete, the Commission of Control as set up by the peace treaty will be withdrawn on the 5th May, and the construction of civil aircraft will be again permitted as from that date.

Such manufacture, however, will be subject to certain restrictions as to size, ceiling and range which have been agreed upon by the Allies, who have also decided that some form of supervision is necessary to ensure that the German manufacturers are not constructing aircraft which could be used as war aircraft. The Conference of Ambassadors have approved of an organisation for this supervisory body which is to be known as the Aeronautical Committee of Guarantee. The German Government have now been informed of the powers which will be held by this committee which will be set up in Germany as from the 5th May next.

The German Government have already agreed in principle to the establishment of supervision as well as to the restrictions on the building of aircraft, but it is possible that they may make some protest before accepting the demands of the Ambassadors.

An article in a recent issue of the ' Berliner Tageblatt ' gives some indication of the observations which the German Government may make.

After pointing out that the allied rights in regard to aerial navigation over German territory come to an end on the 31st December of this year, the writer goes on to show that should Germany not adhere to the Air Convention, the German government will be entitled to draft such legislation as they desire in so far as flight over German territory is concerned; this would mean that allied aircraft would be compelled to conform with such rules.

In the hope of bringing pressure to bear on the allied representatives and inducing them to moderate their restrictions on German civil aircraft the writer recommends the German Government, in accepting the allied demands, to specify that legislation will be passed next year, in accordance with which no allied aircraft will be allowed to fly over or land in German territory except those machines which fulfil the conditions laid down by the allies for German civil aircraft. The hope is expressed that the necessity of flying over Germany will induce the allied aeronautical interests to approach their governments with a view to mitigating the restrictions to be imposed on German aircraft.

The following is a brief description of the position of civil aviation in Germany :

During its two years' stay in Germany the commission of control have taken delivery of or destroyed all the aeronautical material which existed in Germany in January, 1920, at the time of the ratification of the peace treaty. A small proportion of this material has, through exportation, eluded confiscation by the commission, but, owing to its old design, no military value need be attached to it.

There is every indication that civil aviation in Germany will follow on lines of development similar to those which were so successful in the case of the Mercantile Marine in the years before the war. The government offer attractive subsidies and the firms enjoy the support of the banks and other financial interests. In the field of aviation, as formerly in the Merchant Service, co-operation and no

dispersal of effort is the guiding principle. All firms of standing are formed into two main groups—the Lloyd Luft Dienst and the Aero Union ; the former being assisted by the Nord Deutsche Lloyd and the latter by the Hamburg-America line and the Allgemeine Electricitäts Gesellschaft. The Lloyd Luft Dienst comprises the Sablatnig, Rumpler and the Junkers concerns, while the Aero Union is composed of the Deutsche Luft Reederei and the Zeppelin firm.

The government paid a subsidy of twelve million marks in 1920, and this amount was increased to twenty-six million marks in 1921. This grant was only given in return for the fulfilment of certain conditions in regard to mileage, upkeep of machines, and the carriage of mail matter. Air-mail services which were suspended during the winter to allow of repairs to the machines are now being resumed.

During last year air navigation was carried on by eight companies which operated the following routes :—

Route.	Firm.
Berlin to Bremen	Sablatnig.
„ Hamburg	Deutsche Luft Reederei.
„ Dortmund	„ „
„ Munich	Rumpler.
„ Dresden	Deutsche Luft Reederei.
„ Königsberg	Sablatnig.
Hamburg to Magdeburg and Dresden ...	„
Munich to Constance	Bayerische Luft Lloyd.

There is little doubt that the allied legislation which prohibited the maintenance by Germany of any military or naval air force had the effect of freeing designers from old conceptions and enabled them to concentrate their efforts on evolving a purely commercial machine. The Junker aeroplane and the Dornier flying-boat (both monoplanes) are excellent illustrations of what has been achieved in this respect. Machines constructed by the Sablatnig firm are also considered highly efficient.

The achievements of civil aviation in Germany during the past two years when a commission of control has been confiscating or destroying material, when construction has been prohibited, and when commercial stability has frequently been threatened by violent political upheavals, give some index as to the development which may be expected in the future when comparative freedom will be enjoyed. That eleven air-lines were operated in 1920 and eight in 1921, that as much as six thousand miles were covered daily during one period last summer with just over one hundred old military machines, can be taken as sufficient proof that aviation will not lack the support of practical enterprise and initiative.

Even were allied legislation to make civil aviation in Germany economically unprofitable, there is every indication that German engineers, designers and constructors would transfer their energies to foreign lands. Proof of this is already to hand in the fact that negotiations are even now approaching completion for the manufacture of German aircraft and the operation of air-lines with German personnel and material in such countries as America, Spain, the Argentine, Brazil, Holland, Sweden and Finland.

The support of the German Government is backed by a widespread propaganda which already provides for instruction in aerodynamics at schools and universities, by the formation of unions and societies for stimulating public interest in the future of aviation, and the enrolment of former pilots in patriotic associations.

No remarks on the possible future of civil aviation in Germany would be complete without reference to the great hopes which the Germans continue to place in lighter-than-air craft. The unsuccessful efforts in the allied countries are in striking contrast with results obtained in Germany. The Zeppelin Company constructed two small airships (not exceeding 25,000 cubic metres) and maintained a regular service from Berlin to Stockholm in the winter of 1919-1920. The American Government have recently placed an order with the Zeppelin Company for the construction of a 70,000 cubic metre airship, and American business interests are understood to be approaching German firms with an offer to co-operate in building airships in America with a view to establishing a mail service from New York to London and Berlin.

SOME FOREIGN MILITARY PUBLICATIONS.

FRANCE.

REVUE MILITAIRE FRANÇAISE.

No. 6 (December, 1921).

THE GENESIS OF THE GERMAN PLAN OF CAMPAIGN. (End.)

OPERATIONS OF THE 114TH BATTALION OF CHASSEURS ALPINS ON 23 JUNE 1916. (Verdun.)

THE MANŒUVRE OF MONTDIDIER. (1918.)

THE METHODS OF ARTILLERY SUPPORT OF THE ATTACK DURING THE COURSE OF THE WAR.

THE APPROACHING PUBLICATION OF AN OFFICIAL WORK ON THE GREAT WAR. (Notice of a Précis accompanied by documents on the French operations.)

No. 7 (January, 1922).

THE CAMPAIGN OF HINDENBURG—LUDENDORFF ON THE EASTERN FRONT (First instalment, 1914, by General Buat; continued in following numbers.)

THE FRENCH TROOPS IN ITALY.

SOME THOUGHTS ON MANUFACTURING INDUSTRIES IN WAR.

NOTE ON A GERMAN CONTROVERSY ABOUT INFANTRY. (Difference of opinion between the Editor of the Training Manual and the War Ministry.)

THE FUTURE OF THE TANK.

No. 8 (February, 1922).

THE BATTLE OF WARSAW. (August, 1920.)

STUDY OF A SYSTEM OF ARTILLERY. (Deals with the various duties of artillery in a modern battle.)

TANKS AND THE HIGH COMMAND. (The point made is, that these creations are essentially an infantry weapon; the High Command should no more trouble about them directly than it does about machine guns, trench-mortars, etc.)

THE TEACHING OF ORGANIZATION AT THE STAFF COLLEGE. (Advocates the teaching of so-called business organization.)

REVUE MILITAIRE GÉNÉRALE.

No. 12 (December 1921).

THE BREAK-UP OF THE RUSSIAN FRONT.

THE RE-CASTING OF THE TRAINING MANUALS AND OUR DOCTRINE OF WAR. (Continued.)

COMPARATIVE STUDY OF INFANTRY FIRE TACTICS BEFORE AND AFTER 1914–18. (Continued.)

STRATEGY AND OPERATIONS IN THE EAST. (Continued.)

THE EMPLOYMENT OF ARTILLERY. (Continued.)

No 1 (January, 1922).

THE CAVALRY THAT WE WANT. (By Général Robillot, who demands "Strong and Numerous Cavalry, essentially mobile and rapid, which can fight equally well a-horse and a-foot, provided with all the means of transport necessary.")

THE LA SOIF TRENCH. (Fighting at St. Mihiel, by Général Cordonnier.)

THE FRENCH CAVALRY IN THE FIRST THREE MONTHS OF THE WAR. (To be continued; this part only reaches 17 August, 1914.)

No. 2 (February, 1922).

CONTAINS CONTINUATION OF FOUR OF THE ABOVE ARTICLES.

No. 9 (March, 1922).

SOME REMARKS ON THE RE-ORGANIZATION OF THE ARMY. (Combats the idea of a small professional army which, in time of war, would be expanded by obligatory service.)

THE SEVENTH INTERNATIONAL AIR EXHIBITION.

THE MILITARY SITUATION IN GERMANY. (A most interesting account of the German army of to-day, its numerous officers and N.C.O.s—more numerous than the rank and file—and its means of expansion.)

LES ARCHIVES DE LA GRANDE GUERRE.

No. 27 (October, 1921).

THE CRISIS OF THE AUSTRO-GERMAN ALLIANCE UNDER THE MINISTRY OF COUNT CZERNIN.

THE EVIDENCE OF GENERAL LANREZAC ON THE RÔLE OF THE FRENCH FIFTH ARMY. (August, 1914.)

THE INTERMEDIARY. (Diary of a prisoners of war camp in Germany.)

THE PEACE CONFERENCE. (Notes of the American experts.)

No 28 (November, 1921, but received in February, 1922).

THE CRISIS IN THE AUSTRO-GERMAN ALLIANCE DURING THE MINISTRY OF COUNT CZERNIN.

THE EVIDENCE OF GENERAL LANREZAC ON THE ROLE OF THE (FRENCH) FIFTH ARMY IN AUGUST 1914.

THE KAPP COUP D'ETAT.

THE RESPONSIBILITY FOR CAPORETTO. (Statements of Generals Cadorna and Capello.)

THE AUSTRIAN PEACE MANŒUVRES, September, 1918. (Letter of Wilhelm II. to the Emperor Karl.)

No. 29 (December, 1921, but received March, 1922).

A VILLAGE DURING THE GERMAN OCCUPATION. (By the Acting Maire.)

AT GERMAN GREAT HEADQUARTERS. (Extracts from the Works of the Austrian representative, General Stürgkh.)

BELGIUM.

BULLETIN BELGE DES SCIENCES MILITAIRES.

No. 8 (December, 1921).

A PROPOS OF BATTLE OUTPOSTS.

OPERATIONS OF THE BELGIAN ARMY. (Continued; 13 September, 1914, retreat into Antwerp.)

DID THE GERMAN ENVELOPING MOVEMENT IN AUGUST, 1914, SURPRISE THE FRENCH GENERAL STAFF. (By Lt.-Colonel Nuytem of the Belgian General Staff. He finds that the French had an inexact appreciation of the number of Corps at the disposal of the Germans; a more or less erroneous conception of the employment and value of the German Reserve formation; and were surprised.)

ARTILLERY BARRAGES.

GROUND OBSERVATION OF ARTILLERY FIRE.

THE MOBILIZATION OF THE NATION IN VIEW OF WAR.

SCIENTIFIC ORGANIZATION AND LABORATORY WORK AS FACTORS OF VICTORY.

THE BARRACKS CINEMA.

No. 1 (January, 1922).

OPERATIONS OF THE BELGIAN ARMY. (Continued; Siege of Antwerp, 14–27 September, 1914.)

PROTECTION ON THE MARCH.

RÔLE OF THE BELGIAN AND FRENCH AIR SERVICES ON THE WESTERN FRONT.

DIRECTIONAL WIRELESS.

THE HAND-GRENADE.

No. 2 (February, 1922).

OPERATIONS OF THE BELGIAN ARMY. (The German Siege operations at Antwerp.)

CONTRIBUTION TO THE STUDY OF THE PROBLEM OF TACTICAL SECURITY.

THE INTERIOR ECONOMY OF A DIVISION.

STUDY OF THE TECHNICAL WEAPONS REQUIRED BY INFANTRY.

ORGANIZATION OF INFANTRY.

No. 3 (March, 1922).

A PROPOS OF THE SIEGE OF NAMUR.

INFANTRY BATTERIES.

GERMANY.

WISSEN UND WEHR.

No. 1 (January, 1922).

CROWN PRINCE FREDERIC AND FRANCE. (A memorial article for Frederic the Great's birthday, 24 January, 1712, by Von Boetticher, to prove Frederic's suspicion of France.)

THE NEW EUROPE. (A political geographical study of the results of the late Treaties.)

THE FRENCH ARMY AND THE REVOLUTION. (The development of the French army from the regiments of Louis XIV. The revolutionary "Clubs" are compared to the Soviets of to-day.)

FRANCE'S ADVANCE TO THE RHINE.

PICTURES FROM THE GREAT FIGH TAT VERDUN. (Personal reminiscences of an engineer officer.)

No. 2 (March, 1922).

TANNENBERG FROM THE RUSSIAN SIDE.

CÆSAR AS COMMANDER AND STATESMAN IN THE LIGHT OF MODERN TIMES.

THE STEIN-HARDENBERG REFORMS.

MILITÄR-WOCHENBLATT.

(Articles of military interest concerning the war which have appeared between November, 1921, and March, 1922. For previous articles, see the R.U.S.I. JOURNAL of February, 1922.)

Volume 106, No. 18.

THE DOWNFALL OF THE CENTRAL POWERS.

A review by General von Kuhl of the book of this title by Karl Nowak. The author makes several attacks on General Ludendorff, accusing him, among other things, of lack of imagination, but the reviewer does not approve of any of his arguments. It is also stated by Nowak that Ludendorff threatened to declare war on Austria in August, 1918.

FRENCH CASUALTIES.

The number of killed in the French Army during the whole period of the war is given as 1,301,567, made up as follows: 1914, 301,324; 1915, 348,867; 1916, 252,286; 1917, 163,716; 1918, 235,374.

No. 20.

THE RAILWAYS ON THE GERMAN RIGHT FLANK DURING THE BATTLE OF THE MARNE.

An interesting article by Major Kretschmann praising the work of the railway troops in the first weeks of the war. He gives the position of rail-heads at various dates during the advance into France, describes the difficulties, and states that there was a complete line from immediately behind the right wing right back to Germany in working order at the time the Battle of the Marne was engaged.

No. 21.

THE LEPEL (43RD INFANTRY) BRIGADE DURING THE BATTLE OF THE MARNE.

This brigade, under General von Lepel, arrived from Brussels at Verberie on the 8th September, and on the 9th was ordered to carry out the attack against the rear of the French Sixth Army, advancing against the Ourcq, in conjunction with the offensive of the remainder of the German First Army. The account shows that the brigade had a narrow escape. and that its retirement was not as voluntary as former reports of the battle had led one to believe.

No. 21.

THE ROAD TO REVOLUTION.

General von Wrisberg traces the growth of the Independent Socialist Party in Germany and the energetic peace propaganda it conducted throughout the war until finally in February, 1918, under Emil Barth, it worked steadily and openly towards an armed uprising against the Government. Its propaganda on the lines of communication, General Wrisberg asserts, did much to weaken the resisting power of the Army, by infecting men returning from leave and young recruits with revolutionary ideas.

No. 22.

A FRENCH VIEW OF THE STRATEGY OF THE WAR.

A review of de Cirrieux's book of this name by General von Kuhl. He says that it is the first book from the Allied side to give anything like a fair criticism of events.

No. 23.

THE GERMAN INTELLIGENCE SERVICE DURING THE WAR.

This article is a reply by General von Kuhl to a lecture by General Macdonogh at the Royal Engineers' Institution, given in that JOURNAL in full. He denies General Macdonogh's statement that the failure of the German Intelligence Service was the main cause of their loss of the war. He criticises in this sense two particular statements of the lecturer's (i) that the rate of Russia's mobilization was underestimated, and (ii) that the Germans knew very little of the dates and places of the disembarkation of the B.E.F. or of its destination.

No. 25.

LIEUTENANT-COLONEL HENTSCH'S MISSION.

Further comments on this important feature of the Battle of the Marne. It does not, however, contain any new facts beyond those already given by Colonel Muller-Loebnitz in his pamphlet, "Die Sendung von Oberstleutnant Hentsch," based on the author's researches in the archives of the German War Ministry.

No. 26.

THE GERMAN WAR OFFICE IN THE WAR.

An interesting article by General von Wrisberg, and in some cases a defence of the German War Office. The writer states, for example, that it was the lack of nerve of the Supreme Command that lost the Marne in 1914, and not the failure of the German War Office to supply the three extra corps asked for in 1912, the presence of which, on the battlefield in September, 1914, would, it is claimed, have been decisive in Germany's favour. The work of the German War Office is exemplified by the fact that the artillery establishment was expanded from 600 field batteries in peace time to 2,800 in 1918 (an expansion, however, not so creditable as that of the Allies in the same period). The writer admits that, at the beginning of the war, Germany did not keep back enough officers for training purposes, a fault, however, which was committed by all the belligerent War Ministries.

GERMAN PROPAGANDA IN THE WAR.

War propaganda was not begun in any organised form until the spring of 1915, when it was taken up by the German Home Office and assisted later by the Foreign Office. Its poor results are compared very unfavourably with the success of the propaganda work of the Entente.

No. 27.

WITH THE RUSSIAN ARMY, 1914–1917.

A review of Major-General Sir A. Knox's book of this title, which is given high praise. The reviewer hopes it will be translated into German so that the Fatherland may learn what Bolshevism really is.

DEATH OF GENERAL VON BESELER.

An obituary notice of the Commander of the III Reserve Corps at the outbreak of war, and subsequently the victor of Antwerp and of Nowogeorgewski. He died at the age of 71.

PRINCIPAL ADDITIONS TO THE LIBRARY.

February, March, and April, 1922.

Histories.

The Sixth Gordons in France and Flanders (with the 7th and 51st Divisions). By Capt. D. Mackenzie, M.A., M.C. Illustrations and maps. 12s. 6d. 8vo. Aberdeen, N.D.

"The Robin Hoods," 1/7th, 2/7th and 3/7th Battalions Sherwood Foresters, 1914–18. Written by Officers of the Battalions. 8vo. Illustrations and maps. (J. & H. Bell & Co.) Nottingham, 1921. (Presented by Lieut.-Col. A. W. Brewill, D.S.O.)

The Official History of Australia in the War of 1914–1918. Vol. I.: The Story of Anzac—The First Phase. By C. E. W. Bean. Illustrations and maps. 8vo. (Angus & Robertson, Ltd.) Sydney, 1921. (Presented by the Publishers.)

The Regimental Roll of Honour and War Record of the Artists Rifles, 1/28th, 2/28th and 3/28th Battalions, The London Regiment (T.A.). Commissions, Promotions and Appointments, and Rewards for Service in the Field obtained by Members of the Corps since 4th August, 1914. Illustrations. Third Edition. 8vo. (Howlett & Sons.) London, 1922. (Presented by Colonel H. A. R. May, C.B., V.D.)

The 28th County of London Battalion The London Regiment, Artists Rifles, Abergavenny Camp, 1913, in which is incorporated Conditions of Service and Notes on the Regiment, 1920. Illustrations. 8vo. N.P., N.D. (Presented by Colonel H. A. R. May, C.B., V.D.)

University of St. Andrew's. Roll of Honour and Roll of Service, 1914–1919. 8vo. (R. & R. Clark, Ltd.) Edinburgh, 1920. (Presented by Professor Sir P. R. Scott Lang, M.A., V.D.)

A Short History of the East Yorkshire Regiment. Compiled by Capt. E. L. P. Edwards, 1st Battalion. 8vo. (Gale & Polden.) Aldershot, 1913. (Presented by R. J. Jones.)

The 18th Division in the Great War. By Capt. G. H. F. Nichols (Quex). Illustrations and maps. 36s. 8vo. London, 1922.

The Sussex Yeomanry and 16th (Sussex Yeomanry) Battalion Royal Sussex Regiment, 1914–1919. By Lieut.-Col. H. I. Powell-Edwards, D.S.O. Illustrations and maps. 10s. 6d. 8vo. London, N.D.

The Signal Service in the European War, 1914 to 1918 (France). By Major R. E. Priestley, M.C., B.A. Illustrations and maps. 8vo. Chatham, 1921. (Presented by the Council of the Institution of Royal Engineers.)

The Work of the Royal Engineers in the European War, 1914–19. Supply of Engineer Stores and Equipment. 8vo. Published by the Sect., R.E. Institute, Chatham, 1921. (Presented by the Council of the Institution of Royal Engineers.)

The Work of the Royal Engineers in the European War, 1914–19. Bridging. 8vo. Published by the Sect., R.E. Institute, Chatham, 1921. (Presented by the Council of the Institution of Royal Engineers.)

THE WORK OF THE ROYAL ENGINEERS IN THE EUROPEAN WAR, 1914–19: (1) WATER SUPPLY, FRANCE. (2) WATER SUPPLY, EGYPT AND PALESTINE. 8vo. Published by the Sect., R.E. Institute, Chatham, 1921. (Presented by the Council of the Institution of Royal Engineers.)

RECORDS OF THE I/XXI PUNJABIS. 8vo. Aldershot, N.D. (Presented by the Officers, I/XXI Punjabis.)

THE NEW ZEALANDERS AT GALLIPOLI. By Major F. Waite, D.S.O. Illustrations and maps. 9s. 8vo. Wellington, 1921.

THE NEW ZEALAND DIVISION, 1916–1919. By Colonel H. Stewart, C.M.G., D.S.O., M.C. Illustrations and maps. 12s. 6d. 8vo. Wellington, 1921.

THE ROYAL FUSILIERS IN THE GREAT WAR. By H. C. O'Neill, O.B.E. Illustrations and maps. 21s. 8vo. London, 1922.

MEMORIAL RECORD OF THE 7TH (S) BATTALION THE OXFORDSHIRE AND BUCKINGHAMSHIRE LIGHT INFANTRY. By Lieut.-Col. C. Wheeler, D.S.O. Illustrations and maps. 10s. 8vo. Oxford, 1921.

A SHORT HISTORY OF THE RIFLE BRIGADE. Second Edition (Revised to 1918). By Major H. G. Parkyn, O.B.E. 8vo. London, 1921. (Presented by the Author.)

WAR STORY OF THE 1/8TH (TERRITORIAL) BATTALION WORCESTERSHIRE REGIMENT. By E. C. Corbett. 2s. 6d. 8vo. Worcester. 1921.

MARLBOROUGH AND THE RISE OF THE BRITISH ARMY. By C. T. Atkinson. Illustrations and maps. 8vo. (G. P. Putnam's Sons.) London, 1921. (Presented by the Publishers.)

AN ADMIRAL'S YARNS, STRAY MEMORIES OF FIFTY YEARS. By Admiral Sir Charles Dundas of Dundas, K.C.M.G. Illustrations. 16s. 8vo. London, N.D.

A REVISION OF THE TREATY. By J. Maynard Keynes, C.B. 7s. 6d. 8vo. London, 1922.

MARS STRIPT OF HIS ARMOUR, OR, THE ARMY DISPLAYED IN ALL ITS TRUE COLOURS. 8vo. London, N.D. (Presented by Colonel Sir A. C. E. Welby, K.B.E.)

CAMPAGNES DE L'ARMÉE PIÉMONTAISE, 1848–1849. Illustrations. Folio. N.P., N.D. (Presented by Lieut.-General Sir A. E. Codrington, K.C.B., K.C.V.O.)

CHRONOLOGICAL RECORDS OF THE BRITISH, ROYAL AND COMMERCIAL NAVY FROM THE EARLIEST PERIOD (A.D. 827) TO THE PRESENT TIME (1827). Folio. London, 1827. (Presented by Lieut.-General Sir A. E. Codrington, K.C.B., K.C.V.O.)

MS. BOOK OF COMMAND ORDERS, THE CASTLE, CAPE TOWN, FROM 1ST NOVEMBER 1813, TO 25TH JUNE, 1815. (Presented by the Officers i/c Administration South Africa.)

PAMPHLET DATED 1809, ENTITLED "A NARRATIVE OF THE CIRCUMSTANCES ATTENDING THE DESTRUCTION OF THE FRENCH MEN-OF-WAR IN BASQUE ROADS. (Presented by Miss Browne.)

LAST DAYS IN NEW GUINEA. BEING FURTHER EXPERIENCES OF A NEW GUINEA RESIDENT MAGISTRATE. By Capt. C. A. W. Monckton. Illustrations and maps. 18s. 8vo. London, 1922.

JAPAN AND THE FAR EAST CONFERENCE. By H. W. Taft. 5s. 8vo. New York, 1921.

A SHORT HISTORY OF THE ORDER OF SAINT JOHN OF JERUSALEM. By E. M. Tenison. 8vo. London, 1922. (Presented by the Author.)

REMINISCENCES OF A CRIMEAN VETERAN OF THE 17TH FOOT. By R. B. Parsons. 12mo. Kendal, 1905. (Presented by Capt. W. Thomas.)

STANDING ORDERS FOR THE THIRD, OR KING'S OWN REGIMENT OF DRAGOONS. Issued by Lieut.-Col. G. B. Mundy, 1804. 8vo. Dublin, 1805. (Presented by Brig.-General F. E. Wallerston, C.B.)

HAKLUYT SOCIETY. SECOND SERIES. JOURNAL OF THE TRAVELS OF FATHER SAMUEL FITZ. Translated by Rev. Dr. G. Edmundson. 8vo. London, 1922.

THE QUARTERMASTER CORPS IN THE YEAR 1917 IN THE WORLD WAR. By Henry G. Sharpe, Major-General U.S. Army. 8vo. New York, 1921. (Presented by Major-General H. G. Sharpe, U.S. Army.)

THE UNITED STATES IN OUR OWN TIMES, 1865–1920. By P. L. Haworth. 16s. 8vo. (G. Allen & Unwin, Ltd.) London, 1920.

REGIMENTAL STANDING ORDERS FOR THE 62ND REGIMENT. By General Edward Mathew. 8vo. Poole, 1798. (Presented by F. W. Hardwick, Esq.)

IMPERIAL MILITARY GEOGRAPHY. By J. Fitzgerald Lee. Maps. 12s. 6d. 8vo. (William Clowes & Sons.) London, 1922. (Presented by the Publishers.)

ETAT MILITAIRE DE FRANCE POUR L'ARMÉE, 1789. 8vo. Paris, 1789. (Presented by Lieut.-Col. W. H. James.)

SOME HISTORICAL NOTICES OF THE O'MEAGHERS OF IKERRIN. By J. C. O'Meagher. Illustrations. 8vo. London, N.D. (Presented by Lieut.-Col. W. O'Meara.)

LES COMBATTANTS FRANÇAIS DE LA GUERRE AMÉRICAINE, 1778–1783. Illustrations. 8vo. Washington, 1905. (Presented by Lt.-Col. W. O'Meara.)

A SHORT HISTORY OF BRITISH EXPANSION. By J. A. Williamson. Maps. 25s. 8vo. (Macmillan & Co.) London, 1922.

SOME EXPERIENCES OF A NEW GUINEA RESIDENT MAGISTRATE. By Capt. C. A. W. Monckton. Illustrations. 8vo. (John Lane.) London, 1921.

German Books on the late War.

Presented by Major-General Hon. Sir F. R. Bingham, C.M.G., C.B.

DER GROSSE KRIEG.
- Vol. 1. LÜTTICH-NAMUR.
- Vol. 3. DIE SCHLACHT BEI LONGWY.
- Vol. 11. KÄMPFE IN DER CHAMPAGNE (WINTER, 1914–HERBST 1915).
- Vol. 20. DIE WINTERSCHLACHT IN MASUREN.
- Vol. 21. GORLICE-TARNOW.
- Vol. 24. DIE SCHLACHT BEI GRODEK-LEMBERG (JUNI, 1915).
- Vol. 26. DIE KÄMPFE DER BUGARMEA.
- Vol. 27/28. DER DURCHBRUCH AM NAREW (JULI/AUGUST, 1915).
- Vol. 31. DIE RUSSISCHE FRÜHJAHRSOFFENSIVE, 1916.
- Vol. 33. DIE BEFREIUNG SIEBENBÜRGENS UND DIE SCHLACHTEN BEI (TARGU ZIU) UND AM ARGESCH.
- Vol. 39. DIE BEFREIUNG VON LIVLAND UND ESTLAND (18 FEBRUAR BIS 5 MÄRZ, 1918).

HERMANN STEGEMANNS GESCHICHTE DES KRIEGES. Vols. 3 and 4.

MIT LETTOW-VORBECK DURCH AFRIKA.

DER FELDZUG DER 9 ARMEE GEGEN DIE RUMÄNEN U. RUSSEN, 1916/17.

LIMAN VON SANDERS' FÜNF JAHRE TURKEI.

DER MARNEFELDZUG, 1914. General K. Von Kuhl. 8vo. Berlin, 1921.

ZWISCHEN KAUKASUS UND SINAI. 2 vols. 8vo. Berlin, 1921.

A PRISONER IN TURKEY. By J. Still. 7s. 6d. 8vo. (John Lane.) London, 1920.

PETIT ALMANACK DE LA COUR DE FRANCE. 12mo. Paris, 1808. (Presented by W. H. Fairbairn, Esq.)

UNDER TEN VICEROYS. THE REMINISCENCES OF A GURKHA. By Major-General N. Woodyatt, C.B., C.I.E. Illustrations. 16s. 8vo. London, 1922.

THE NEW WORLD. PROBLEMS IN POLITICAL GEOGRAPHY. By I. Bowman, PH.D. Illustrations and maps. 21s. 8vo. London, 1922.

INDIA. ITS ADMINISTRATION AND PROGRESS. By Sir John Strachey, G.C.S.I. Fourth Edition. Revised by Sir T. W. Holderness, K.C.S.I. Maps. 8vo. London, 1911.

A BLACK WATCH EPISODE OF THE YEAR 1731. Compiled from Contemporary Records. With Introduction and Notes by H. D. MacWilliam. 8vo. Edinburgh, 1908.

THE MARCHES OF THE BRITISH ARMIES IN THE PENINSULA OF INDIA DURING THE CAMPAIGNS OF 1790 AND 1791. By Major Rennell. 8vo. London, 1792.

THE BIG FOUR AND OTHERS OF THE PEACE CONFERENCE. By R. Lansing. 8s. 6d. 8vo. London, 1922.

IRELAND IN THE LAST FIFTY YEARS, 1866–1918. By E. Barker. 3s. 6d. 8vo. Oxford, 1919.

AFTER THE WAR, 1919 TO 1921. A DIARY. By Lieut.-Col. C. A'Court Repington, C.M.G. 8vo. London, 1922.

LORD HOOD AND THE DEFENCE OF TOULON. By J. Holland Rose. 16s. 8vo. Cambridge, 1922.

LECTURES ON LAND WARFARE. A TACTICAL MANUAL FOR THE USE OF INFANTRY OFFICERS. 8s. 6d. 8vo. (William Clowes & Sons.) London, 1922. (Presented by the Publishers.)

MODERN CAVALRY. STUDIES ON ITS RÔLE IN THE WARFARE OF TO-DAY. WITH NOTES ON TRAINING FOR WAR SERVICE. By Major M. Wheeler-Nicholson, U.S.A. 10s. 8vo. (MacMillan & Co.) New York, 1922. (Presented by the Publishers.)

LIFE OF LIEUT.-GENERAL SIR EYRE COOTE, K.B. By Colonel H. C. Wylly, C.B. Portraits and maps. 24s. 8vo. (Oxford University Press.) 1922. (Presented by the Author.)

COLLECTION OF LETTERS AND DIARIES OF THE LATE FIELD-MARSHAL LORD RAGLAN, RELATING TO THE CRIMEA WAR. (Presented by Major Lord Raglan, J.P.)

(This Collection will not be available for the use of Members until it has been Catalogued.)

NOTICES OF BOOKS.

Marlborough and the Rise of the British Army. By C. T. ATKINSON. (G. P. Putnam's Sons, London: The Knickerbocker Press.)

This book is a valuable addition to the literature dealing with the Duke of Marlborough, and is evidently the result of great industry and research. It brings out very clearly the enormous difficulties, other than military, with which the great Duke had to contend, and deals judicially and impartially with the calumnies which have tarnished the reputation of the greatest soldier which our country has produced. The verdict of the average reader will be that a man who inspired such intense devotion amongst his subordinates, and who was honoured even more in other countries than in his own, could not have been as black as he has sometimes been painted.

The study of Marlborough's character and strategical conceptions is the most interesting side of the book. As a text-book it is hardly suitable for the military reader who may wish to make a detailed study of Marlborough's campaigns.

The Signal Service (France). By Major PRIESTLEY, M.C., B.A., late R.E. "Work of the Royal Engineers in the European War, 1914–1919" series. Plates and illustrations. (Mackay & Co., Ltd., Chatham.)

The story of the Signal Service in France is a mirror of the growth of our armies from the first seven divisions of 1914. Major Priestley's narrative first describes the evolution of Army telegraphs and signalling, and the process by which, in 1912, all means of inter-communication for the formations of the Army became merged into the Signal Service branch of the Royal Engineers. The foundations of this service had been well and truly laid by the Aldershot committee, presided over by General Sir Archibald Murray, in 1906. In spite of their small dimensions, these units of the British Expeditionary Force survived the stress of 1914, and grew, developing in response to the demands of that force, until they were serving five armies. The Signal Service had to adapt itself to unforeseen tactical conditions and technical expedients, and to meet an expansion of the Army beyond the wildest of dreams. Sound traditions, and a wise policy pursued with determination, enabled it to rise above its difficulties. The historian reveals the main features of this policy, which were to preserve intact the mobile character and practice of the signal units and to create the closest connection between the Staffs and their Signal advisers. Accordingly, the pressure of position warfare was resisted, the spirit of movement and of the interdependence of Staffs and Signals was fostered, so that when the decisive moment arrived at last, and our Armies gathered way in the autumn advance of 1918, the Signal Service was found ready.

The author brings out clearly the effects on the Signal Service of the various phases of the war—the rapid moves in 1914; the stationary warfare, 1915–1917; the retreats, and then the decisive advance of 1918. He depicts the superhuman efforts of the earlier despatch riders, the decline of visual signalling, the adoption of the telephone forward until it was discredited by the revelations of interception, the rehabilitation of visual methods and the adoption of all kinds of alternative means of signalling, and the burying of masses of cables below the reach of intensive shelling; also the acceptance of Chief Signal Officers in the counsels of the Staff, and the evolution of a chain of signal responsibility throughout the formation of the Army. All these features are described in their proper relation to the progress

of the war. The account given of the organisation of new signal units, and the frequent reorganizations necessary to keep pace with the changing conditions of warfare, caused by the rapid growth of the Artillery arm and of the Air Force, and by the limitations of man-power, will be read with much interest. The explanations offered of the difficulties which attended the development of wireless, and of the evolution of the forward inter-communication methods of 1917–1918, are very instructive. So, too, is the chapter which deals with "The Surprise Battle of Cambrai," and relates the signal secrecy preserved for it, and the lessons thus learned.

Major Priestley has dealt with his subject impartially and on broad lines. The technical aspect is unobtrusive, the individual is eliminated, and the wider problems of general interest are handled critically. It is to be hoped that this careful historian may find opportunity before long to narrate and comment also on the Signal work of the Expeditionary Forces in other theatres of the Great War. Officers of all arms, whether serving or retired, regimental or staff, and other students of war, will find in Major Priestley's work much to elucidate the problems of the Great War, and to assist towards solving those of the military operations of the future.

Under Ten Viceroys : the Reminiscences of a Gurkha. By Major-General N. Woodyatt, C.B., C.I.E. (Herbert Jenkins, Ltd.)

This is an age wherein we all attempt to write our memoirs and publish our diaries. But few of us have such real justification as has Major-General Woodyatt for indulging in this form of literary dissipation, since he is not only an enthusiast about the profession which for so many years he has successfully followed, but he loves India and his Indian comrades, while in his book there is no single word of depreciation of any of those who have been his colleagues, superiors, or subordinates. The author entered the Indian Army in the usual manner, by way of a British battalion stationed in India, and was at first desirous of entering the Cavalry, but later, for certain private reasons, he changed his mind, joined the Infantry, and served for many years with the 3rd Gurkhas, being adjutant of the then newly-raised second battalion. Gurkha regiments are so generally employed whenever there is any unrest, resulting in frontier expeditions on or beyond the Indian border, that General Woodyatt must be considered exceptionally unfortunate in not having seen anything of active service until the Great War broke out. He was then at home on leave, and seems to have hoped—and to some extent to have schemed—to be employed in France, but he was recalled to India, and on arrival was almost at once sent to command a brigade under that fine frontier soldier, General Sir F. Campbell, during operations undertaken against the Bonerwals; when the Third Afghan War broke out General Woodyatt held command of a division mobilised about Chaman.

The author tells us much about the different Viceroys who held high office while he served in India, but he tells us more about the very many distinguished soldiers with whom—in cantonments, in camp, in office, and in the field—he came in contact, and about nearly every one of these he has something fresh and interesting to tell, and many capital stories to narrate. What he has to say about Indian unrest is deserving of very careful study. From beginning to end there is no dull page in Major-General Woodyatt's very cheerily-written book, and it may confidently be recommended equally to Regular soldiers and to those of the Territorial Army with whom, in India, the author was associated, and of whose soldierly qualities he expresses so high an opinion.

Royal United Service Institution.

THE NINETY-FIRST ANNIVERSARY MEETING WAS HELD ON TUESDAY, MARCH 7th, 1922.

LIEUTENANT-GENERAL SIR H. S. G. MILES, G.C.B., G.C.M.G., G.B.E., C.V.O. (Vice-Chairman) presiding.

THE CHAIRMAN: Gentlemen, I am sorry to say that Admiral-of-the-Fleet Earl Beatty, who was to have presided over the meeting this afternoon, is unable to be present, greatly I am sure to our regret, and I find myself in the Chair, in his absence. Earl Beatty has been called away unavoidably to attend a conference in Paris. I will now ask the Secretary to read the Notice convening the Meeting

THE SECRETARY (LIEUT.-COL. SIR ARTHUR LEETHAM, C.M.G.) read the Notice convening the Meeting, which had appeared in three morning papers, including *The Times*, in accordance with the Bye-laws.

THE CHAIRMAN: Gentlemen, the first resolution is: "That the Report and Accounts, as circulated, be taken as read and adopted. I will ask the Chairmen of the Journal and Library, Finance, and Museum Committees to let you know how matters stand from their points of view

ANNUAL REPORT FOR 1921.

Vice-Patron.

Colonel H.R.H. The Prince of Wales, K.G., G.C.M.G., G.B.E., M.C., paid a visit to the Institution on May 30th, and inspected the Museum and the building generally.

Vice-Presidents.

The Council regret to have to report the death of Admiral-of-the-Fleet the Marquess of Milford-Haven, P.C., G.C.B., G.C.V.O., K.C.M.G., A.D.C.

Admiral-of-the-Fleet Sir A. D. Fanshawe, G.C.B., G.C.V.O., has been appointed a Vice-President.

Council.

Lieutenant-General Sir H. C. Sclater, G.C.B., G.B.E., Lieutenant-General Sir E. S. Bulfin, K.C.B., C.V.O. (having proceeded on foreign service), have vacated their seats on the Council, which have been filled by the appointment of Field-Marshal Sir W. R. Robertson, Bart., G.C.B., G.C.M.G., K.C.V.O., D.S.O., and General Lord Horne, G.C.B., K.C.M.G., R.A., A.D.C. to H.M. The King, G.O.C.-in-C. Eastern Command.

(Chapter IV., Para. 9, of the Bye-Laws.)

The following Members of the Council, having completed three years' service, retire :—

Admiral-of-the-Fleet The Earl Beatty, G.C.B., O.M., G.C.V.O., D.S.O.
Captain H. D. Briggs, C.M.G., R.N.
Lieut.-General Sir H. S. G. Miles, G.C.B., G.C.M.G., G.B.E., C.V.O.

The following are the Candidates nominated for the vacancies :—

Royal Navy (2 Vacancies).

Admiral-of-the-Fleet The Earl Beatty, G.C.B., O.M., G.C.V.O., D.S.O.
Admiral Sir R. G. O. Tupper, K.C.B., C.V.O.

Regular Army (1 Vacancy).

General Sir E. G. Barrow, G.C.B., G.C.S.I., I.A.
Lieut.-General Sir H. S. G. Miles, G.C.B., G.C.M.G., G.B.E., C.V.O.

Membership.

The Council beg to report that during the past year 411 Officers joined the Institution (against 376 in 1920). There were 231 withdrawals and 101 deaths (of which 40 were Life Members), making an increase on the year of 79. The Council trust that Members will do their utmost to introduce new Members during the current year.

The details of Members joining are as follows :—

Regular Army (all arms)	324
Royal Navy	31
Territorial Army	20
Royal Air Force	15
Royal Marines	10
Overseas Forces	6
Royal Naval Reserve	4
Special Reserve	1
Total	411

Total number of Members on December 31st was 5,275.

The detailed list of the various services in which members on the active list are serving has recently been revised, and records the following :—

Regular Infantry 546, Indian Army 262, Royal Navy 388, Royal Artillery 244, Royal Engineers 136, Guards 81, Royal Air Force 78, Territorial Army 70, Departmental Corps 66, Royal Marines 54, Cavalry 50, Royal Naval Reserve 36, Overseas Forces 21. The Council draw attention to the fact that some of these services are inadequately represented, and hope for better results.

Finance.

It will be seen from the Accounts that the year's working has given a balance debit of £1,507 5s. 4d. This is a considerable improvement on the previous year. In order to meet the Expenditure the Council have been obliged to realize £1,600 of their invested funds. The Expenditure over Receipts is mainly due to taxation and rates and to cost of printing. It is anticipated that in this present year there will be a considerable saving in the printing expenses and in other directions.

The application to the Treasury for an increased grant to cover the ground rent, taxes and rates was not successful, in spite of the fact that the original Government grant was voted by Parliament for this purpose, in order that this Institution should be on a similar basis to other Royal Societies.

The invested funds now amount to £18,421 2s. 3d., which is the value of these investments at their market price in the Stock Exchange Official Price List of December 31st, 1921.

MUSEUM.

During the year there have been added 192 new exhibits, all of which have been catalogued, duly recorded in the JOURNAL, and placed on exhibition in the building. The Council desire to express their thanks to the various donors for these valuable additions.

The late Captain A. M. Drummond, Rifle Brigade, bequeathed a valuable collection of mezzotint engravings and prints.

The Air Ministry placed on permanent loan the Compass of Airship R. 34, which flew the Atlantic.

Numerous applications for space, from Regiments (British and Indian) disbanded or about to be disbanded, are being received for depositing their Colours, Drum Banners, Historical Articles and Plate, &c, The Museum Committee will make every effort to accept such exhibits on the understanding that should such Regiments be re-raised they will be returned to them, but it must be borne in mind that the space in the Museum is becoming limited.

The gallery in the Banqueting Hall has been cleared and is now open to Members and the collection is being extended there; it includes the large collection of rifles, weapons of savage tribes, and specimens of old uniforms, also a collection of German uniforms.

The total number of persons who passed through the turnstile amounted to 38,436, against 36,827 in 1920. This includes a number of soldiers, sailors, boy scouts, &c., who were granted free admission, but does not include a considerable number of visitors introduced personally by Members.

The total amount taken at the turnstile was £1,442 15s. 0d., against £1,284 3s. 3d. in 1920, being an increase of £158 11s. 9d. The sales of the Museum Catalogues and Pamphlets amounted to £127 12s. 5d. which must be considered as satisfactory. The price of the Catalogue has now been reduced to 2s.

During the year 63 schools were granted free admission to the Museum, and attendants were especially detailed to conduct these visitors and explain the various exhibits.

The amount standing to the credit of the Museum Purchase Fund is £18 2s. 2d., and the Museum Committee hope that this fund will continue to receive support from the Members, especially those interested in the Museum.

1922 is the "TERCENTENARY" of the completion of the Banqueting Hall; a notice of that fact has been placed at the Museum entrance; the Museum Committee trust

it will be duly appreciated by the Public, also that Members will inform their friends, and express the hope that the Museum receipts may total at least £2,000 during the year.

Library.

The number of books added to the Library during the past year was 246, which includes the following bequests :—By the late Captain F. M. Baird, collection of books on the American Civil War; by the late Colonel J. R. Harvey, D.S.O., collection of old Army Lists and Retired Pay Lists; by Major-General G. A. Egerton, C.B., collection of interesting military books, including a number of court-martial cases.

During the year a large number of books of a non-service nature, which were not considered suitable for retention in the Library, were sold at auction, realizing the sum of £304.

A considerable number of alterations have taken place in the Library in the arrangement of the books. The Regimental Histories, including those of the late war, have now all been placed together; a large number of Naval and Military Magazines, covering roughly the period 1806—1880, which were previously in the Museum Gallery, have been collected together in the Library proper, and should prove of considerable value to future historians; the Regimental Journals and Magazines have also all been grouped together.

Works on the War have been arranged in four groups: Naval, Western Front and General, Eastern Front, and Foreign.

A new feature of the Library is the formation of a special section of books, &c. which are recommended for the various Service Examinations, these include some 500 articles (made into pamphlet form) from such magazines as the Fortnightly and National Review, and embrace such subjects as trade and labour questions, political, and many others of a non-service nature, but which might be helpful in connection with the recent trend of Service Examinations.

The number of books in the Library is now 27,177, there are also 948 maps and manuscripts in the rooms reserved for those articles.

The number of Subscribers to the Lending Library during the past year was 222, compared with 206 in the previous year. The number of books issued to Members on loan was 2,050, as against 2,390 in 1920.

Arrangements have been made with the Admiralty and War Office whereby books may be sent to Members of the Lending Library serving abroad through the official letter bags. Books so issued must be returned in the same way; this will only apply to officers serving in those overseas stations to which the official letter bags are sent. The total period allowed for books thus issued is not to exceed six months.

Periodicals and Journals taken in by the Institution and not required for retention are now sold, on becoming non-current, to Members at a reduced rate.

Major H. G. Parkyn, O.B.E., took over the office of Librarian from Mr. A. D. L. Cary, O.B.E., on the 1st October, 1921.

JOURNAL.

The Quarterly publication of the JOURNAL has been continued up to date, but it has not yet been found possible, owing to the continued high cost of production, to expand the Journal beyond a limit of some 200 pages. Certain minor economies have, where possible, been made, the free-list has been drastically reduced, and in the new printing contract lately entered into it is hoped that a saving of several hundred pounds will be effected. The outside sale of the JOURNAL will for the future be conducted from the Institution, thus saving the discount hitherto given to the trade.

The thanks of the Institution are due to the following writers and lecturers for papers and lectures contributed by them: Lieut.-Colonel B. G. Baker, D.S.O., Major A. F. Becke, Lieut.-Colonel M. A. C. Bird, Wing Commander J. A. Chamier, C.M.G., D.S.O., O.B.E., Major R. G. Cherry, M.C., Major T. E. Compton, Lieut.-Commander V. H. Danckwerts, Captain A. Dewar, O.B.E., Lieut.-Colonel J. C. Dundas, D.S.O., Squadron-Leader C. H. K. Edmonds, O.B.E., D.S.O., Lieut.-Colonel A. Egerton, D.S.O., Major M. C. Festing, D.S.O., Rear-Admiral C. F. Goodrich, U.S. Navy, Colonel-Commandant N. Haig, C.B., C.M.G., "Hajji Baba," Sir Charles Harris, G.B.E., K.C.B., Captain B. H. L. Hart, Major-General B. Burnett-Hitchcock, C.B., D.S.O., Lieut.-Colonel P. Johnson, D.S.O., Lieutenant W. S. King-Hall, R. W. Knollys, Esq., Lieutenant W. K. M. Leader, M.C., Lieut.-Colonel M. F. McTaggart, D.S.O., Major R. B. Pargiter, Colonel R. Rowan-Robinson, D.S.O., the Right Hon. Lord Riddell, Major C. F. Stoehr, Christopher Stone, Esq., Lieut.-Colonel C. B. Dashwood-Strettell, Commander R. N. Suter, D.S.O., Colonel M. G. Taylor, C.M.G., D.S.O., Commander Lord Teignmouth, Colonel John Ward, C.B., C.M.G., M.P., Brigadier-General C. N. Watts, and Brevet Major O. W. White, D.S.O.

The exchange of the JOURNAL with Foreign Governments, and with many Societies in this and other Countries, has been continued so far as this has been possible.

A. LEETHAM, Lieut.-Colonel,
Secretary and
Chief Executive Officer.

February 1st, 1922.

DR. **BALANCE SHEET, 31ST DECEMBER, 1921.** CR.

	£ s. d.	£ s. d.
To Excess of Assets over Liabilities as at 31st December, 1920	85,582 3 5	
Add Additions to Museum Contents during the year to date	960 9 0	
	86,542 12 5	
Add Appreciation of Investments to Market Price as at 31st December, 1921	1,484 7 4	
„ Profit on Realisation of Investments	86 13 6	
	1,571 0 10	
	88,113 13 3	
Less Revenue Account—Deficit for the year to date as per account annexed	1,507 5 4	
		86,606 7 11
„ Sundry Creditors	... ...	1,159 4 1
„ Museum Purchase Fund	... ...	18 2 2
„ Leasehold Redemption Fund	... ...	2,098 12 2
		£89,882 6 4

	£ s. d.	£ s. d.
By Leasehold Building—Whitehall, S.W.		23,101 16 8
„ Furniture, Museum Cases, etc., as at 31st December, 1920		510 4 6
„ Library Books, Pictures, Maps, etc., as valued for Insurance		10,222 0 0
„ Museum Contents, as valued for Insurance (excluding Loan Collection, £23,441) as at 31st December, 1920	£ s. d. 36,053 5 0	
Additions catalogued during the year ...	960 9 0	
		37,013 14 0
„ Investments (at Market Price, 31st December, 1921)—		
£2,421 18*s.* 8*d.* India 3½ % Stock ...	1,404 14 5	
£3,044 17*s.* 11*d.* India 3 % Stock ...	1,568 2 5	
£1,471 8*s.* 6*d.* Nottingham Corporation 3 % Stock...	779 17 2	
£1,181 10*s.* 0*d.* Oxford Corporation 3 % Stock	649 16 6	
£473 17*s.* 9*d.* Canada 3½ % Stock (Hoskier Bequest)	364 17 10	
£12,525 16*s.* 10*d.* 5 % War Stock, 1929–47...	11,555 1 9	
		16,322 10 1
„ Leasehold Redemption Fund—Investment Account (at Market Price, 31st December, 1921)—		
£1,643 14*s.* 2*d.* Ceylon 3 % Stock ...	1,051 19 5	
£1,868 19*s.* 10*d.* London County Council 3 % Stock	1,046 12 9	
		2,098 12 2
„ Sundry Debtors	... ...	257 11 5
„ Cash at Bank...	311 2 3	
„ Cash in hand	44 15 3	
		355 17 6
		£89,882 6 4

We have examined the above Balance Sheet with the Books and Vouchers and certify the same to be correct.
All our requirements as Auditors have been complied with. We have verified the Cash Balances and Investments set out in the Balance Sheet, and, subject to the Leasehold Redemption Fund being sufficient to provide for the depreciation of the Lease, we are of opinion that the Balance Sheet is properly drawn up and correctly shows the position of the Royal United Service Institution on 31st December, 1921.

61½, Fore Street, London, E.C.2, 27th January, 1922.

WILDE, FERGUSON-DAVIE, AND MILLER, Chartered Accountants, Auditors

REVENUE ACCOUNT FOR THE YEAR ENDING 31ST DECEMBER, 1921.

DR.

1920.									
£	s.	d.		£	s.	d.	£	s.	d.
2,641	19	7	To Journal Printing	1,993	16	0			
276	15	11	,, Postage	260	2	2			
144	5	6	,, Literary Services	190	15	8			
266	17	6	,, Library, Purchases and Binding of Books	307	5	7			
122	14	2	,, Periodicals and Newspapers ...	148	6	10			
							2,900	6	3
189	11	2	,, Museum Sundries	80	1	4			
1,955	0	0	,, Salaries	2,105	0	0			
1,991	7	6	,, Wages	1,983	16	6			
195	1	6	,, Attendants' Clothing	264	19	6			
30	0	0	,, Pensions and Gratuities	30	0	0			
							4,463	17	4
580	0	0	,, Ground Rent	580	0	0			
77	9	0	,, Water Rate	77	9	0			
977	1	8	,, Rates	1,050	0	0			
351	0	0	,, Taxes	351	0	0			
							2,058	9	0
14	16	10	,, Insurance Stamps...	...		...	15	15	7
63	0	0	,, Insurance	...		...	55	6	0
178	1	6	,, Fuel...	168	3	1			
36	11	2	,, Lighting	44	4	10			
							212	7	11
590	16	2	,, Repairs	185	13	0			
253	11	8	,, House Expenses and Sundries ...	268	1	0			
							453	14	0
56	18	0	,, Advertising	72	11	0			
35	17	2	,, Shorthand Notes	24	5	8			
							96	16	8
12	9	0	,, Lecture Expenses						
26	5	0	,, Audit and Accountancy	...		...	26	5	0
76	9	2	,, Postage of Letters, Stamps, etc.	78	17	4			
310	18	5	,, Printing and Stationery	204	9	1			
10	11	7	,, Telephone	9	17	10			
							293	4	3
£11,465	9	2					£10,576	2	0

CR.

1920.									
£	s.	d.		£	s.	d.	£	s.	d.
151	16	11	By Sales of Journal	226	15	4			
416	4	10	,, Advertisements in Journal ...	269	9	9			
							496	5	1
102	16	6	,, Lending Library	...		...	112	2	0
1,284	3	3	,, Admissions to Museum	1,442	15	0			
145	3	11	,, Sale of Museum Catalogues and Pamphlets	127	12	5			
—			,, Sale of Duplicate Books	303	19	9			
17	15	8	,, Repairing of Regimental Colours	5	18	2			
							1,880	5	4
4	3	8	,, Miscellaneous Receipts	6	9	11			
145	8	0	,, Rent of Lecture Theatre, etc. ...	190	1	0			
							196	10	11
3,356	16	0	,, Members' Subscriptions	3,513	14	0			
115	6	3	,, Extra Subscriptions	88	4	2			
817	7	0	,, Life Subscriptions	609	12	6			
52	7	0	,, Subscriptions paid in advance ...	41	18	0			
315	0	0	,, Entrance Fees	380	2	0			
							4,633	10	8
1,049	8	5	,, Dividends and Interest	...		...	900	13	8
750	0	0	,, Government Grant	...		...	750	0	0
178	1	1	,, Refund of Income Tax on Investments ...				99	9	0
2,563	10	8	,, By Balance, being Deficit for the year to date				1,507	5	4
£11,465	9	2					£10,576	2	0

CHESNEY MEMORIAL MEDAL FUND.

DR. 31ST DECEMBER, 1921. CR.

1921.		£ s. d.	1921.		£ s. d.
Jan. 1	To Balance, 31st December, 1920	53 1 6	April 15	By Medal—Goldsmiths' & Silversmiths' Co., Ltd ...	15 15 0
June 6	,, Dividend on £230 Bengal & North Western Railway 3½ % Preference Stock	2 16 4	June 10	,, Administration Fee—Royal United Service Institution	0 10 2
Oct. 8	,, Refund of Income Tax on Investments	1 19 3	Dec. 31	,, Balance in favour of Fund	44 8 3
Dec. 5	,, Dividend on £230 Bengal & North Western Railway 3½ % Preference Stock	2 16 4			
		£60 13 5			£60 13 5

We hereby certify the above Account to be correct.

61½, Fore Street, London, E.C.2.
27th January, 1922.

WILDE, FERGUSON-DAVIE, AND MILLER, Chartered Accountants, Auditors.

TRENCH GASCOIGNE PRIZE FUND.

31ST DECEMBER, 1921.

1921.		£ s. d.	1291.		£ s. d.	£ s. d.
Jan. 1	To Balance, 31st December, 1920	100 8 5	March 5	By 1st Prize Essay, 1921	31 10 0	
May 18	,, Dividend on £1,862 19s. 0d. North British Railway 3 % Debenture Stock	19 11 3	,, 18	,, 2nd Prize Essay. 1921	21 0 0	
June 1	,, Dividend on £100 0s. 0d. 5 % War Stock, 1929–47	2 10 0	,, 29	,, 3rd Prize Essay, 1921	10 10 0	63 0 0
,, 8	,, Refund of Income Tax on Investments	16 15 4	June 10	,, Administration Fee, Royal United Service Institution		3 13 1
Nov. 11	,, Dividend on £1,862 19s. 0d. North British Railway 3 % Debenture Stock	19 11 3	Dec. 31	,, Balance in favour of Fund		94 13 2
Dec. 2	,, Dividend on £100 0s. 0d. 5 % War Stock, 1929–47	2 10 0				
		£161 6 3				£161 6 3

We hereby certify the above Account to be correct.

61½, Fore Street, London, E.C.2.
27th January, 1922.

WILDE, FERGUSON-DAVIE, AND MILLER, Chartered Accountants, Auditors.

BRACKENBURY MEMORIAL FUND.

DR. 31ST DECEMBER, 1921. CR.

1921.		£ s. d.	1921.		£ s. d.
Jan. 1	To Balance, 31st December, 1920	88 11 4	June 10	By Administration Fee, Royal United Service Institution	1 5 3
June 2	,, Dividend on £421 1s. 0d., 5 % War Stock 1929–47	10 10 6	July 6	,, Hugh Rees, Ltd.—Books	4 7 9
Dec. 2	,, Ditto ditto ditto	10 10 6	Dec. 31	,, Balance in favour of Fund	103 19 4
		£109 12 4			£109 12 4

We hereby certify the above Account to be correct.

61½, Fore Street, London, E.C.2.
27th January, 1922.

WILDE, FERGUSON-DAVIE, AND MILLER, Chartered Accountants, Auditors.

Tabular Analysis of the state of the Institution.

[A full analysis for each year from 1831 will be found in the Report for 1897.]

Year 1st Jan. to 31st Dec.	Annual Subs. received.	Entrance Fees.	Receipts (from all sources).	Life Subs. received.	Invested Funds at Cost.	Invested in the purchase of Books, &c.	No. of Vols. in Library.	No. of Members on the 31st Dec
	£	£	£	£	£	£		
1831	654	...	654	1,194	...	...	...	1,437
1841	1,450	...	1,643	186	6,000	243	5,850	4,243
1851	1,136	131	1,292	66	666	34	10,150	3,188
1861	2,122	305	2,899	266	2,846	99	11,812	3,689
1871	2,455	237	3,677	538	7,748	202	15,501	3,922
1881	2,893	238	4,967	645	13,670	240	19,920	4,577
1891	2,640	189	5,004	454	21,942	153	23,845	4,204
1901	3,816	197	6,955	358	14,192	289	27,792	5,443
1902	3,806	188	7,063	449	14,491	309	28,167	5,427
1903	3,743	178	6,597	409	15,459	299	28,387	5,361
1904	3,684	184	6,707	448	15,459	301	28,636	5,313
1905	3,713	253	7,756	611	15,459	324	28,851	5,369
1906	3,714	226	6,803	519	16,488	204	29,114	5,404
1907	3,733	211	6,615	573	16,549	256	29,427	5,408
1908	3,741	220	7,205	502	16,612	213	29,667	5,420
1909	3,806	312	7,354	789	16,676	167	29,917	5,535
1910	3,893	269	7,407	573	16,742	326	30,182	5,611
1911	3,988	254	7,319	372	16,810	374	30,624	5,649
1912	4,018	225	7,125	330	16,881	305	31,043	5,654
1913	3,928	159	7,113	266	*12,141	384	31,425	5,580
1914	3,780	101	7,570	98	*12,216	231	31,770	5,338
1915	3,534	46	8,332	77	†14,276	92	31,862	5,000
1916	3,443	13	8,595	344	‡13,537	110	32,064	4,980
1917	3,407	—	8,853	446	§16,414	196	32,425	4,946
1918	3,440	—	9,135	337	‖21,610	124	32,602	4,955
1919	3,654	—	10,332	1,065	¶22,736	347	32,824	5,160
1920	3,524	315	11,465	817	**18,014	267	32,994	5,196
1921	3,644	380	10,576	610	††18,421	307	‡‡27,177	5,275

* Value on December 31st, 1913.
† This includes £2,000 4½ per cent. War Loan.
‡ Value on December 30th, 1916.
§ Value on December 31st, 1917.
‖ Value on December 31st, 1918.
¶ Value on December 31st, 1919.
** Value on December 31st, 1920.
†† Value on December 31st, 1921.
‡‡ During the year a large number of Books of a non-Service nature were sold.

Major-General E. T. DICKSON (Chairman of the Journal and Library Committee): Mr. Chairman, My Lords and Gentlemen, the reports of the Journal and Library Committee are very full and I really do not think I have anything to add to what is contained in those printed reports which are before you. There is, however, one addition which was made at the Council Meeting previous to the Meeting that has been held this afternoon, as regards allowing officers abroad to have the loan of books. The statement is made in the printed report: "The total period allowed for books thus issued is not to exceed six months." On the advice of some of the Naval members on the Council we have extended that period in the case of China for an additional two months. You will notice from the Report that we now have a new Librarian and that certain alterations have been made in the arrangements of the library, which I hope you will consider are improvements. I shall be very happy, to the best of my ability, to answer any questions that the members desire to ask with regard to the Journal and the Library, otherwise I do not think I need detain you any further.

Colonel C. W. TROTTER, C.B., T.D. (Chairman of the Finance Committee): Mr. Chairman, My Lords and Gentlemen, with regard to the question of finance, you will see in the report that the sum of between £1,500 and £1,600 had to be raised from the invested funds in order to balance the receipts and expenditure account. This is about £1,000 less than last year; but I am afraid until we have a larger number of members, and therefore a larger number of subscriptions, or reduced rates and taxes, we shall have to continue this very unfortunate proceeding. As regards the financial position generally, I think I may say that the Balance Sheet is a very sound one. The only alteration is that we have lately sold some of the short-dated Government Stocks and re-invested the money in the permanent Funding 4 per cent. Stock and Conversion 3½ per cent. Stock, and these already show a considerable capital appreciation. The only trouble we have in a financial respect is to try and find some means of getting a larger income; the Secretary is addressing an appeal for more support to all the Officers' Messes throughout the different services. which we trust will have beneficial results.

Commander W. F. CABORNE, C.B., R.D., R.N.R. (Chairman of the Museum and General Purposes Committee): Sir Herbert Miles, My Lords and Gentlemen, it is once more my privilege to say a few words with regard to the Museum, which has received many interesting additions since we last met. However, as practically the whole of the new exhibits have been recorded in the Journal, I only propose to mention one or two items. The first is the gift, by Commander Viscount Broome, R.N., of a full-dress tunic which belonged to the late Earl Kitchener. We already had his Field-Marshal's baton and one or two other articles connected with him; as is well known, all his decorations were lost with him in the "Hampshire."

Owing to the disbandment of certain regiments, we are having deposited a quantity of historical regimental plate and other objects of value, their property, on the understanding that such shall be returned in the event of the respective regiments being once more brought into existence.

All the additions to the Museum have accentuated the question of its congestion and the necessity for some means of expansion, a matter which has been exercising our minds for several years.

At our Annual Meeting in 1913, I announced that a sub-committee of the Council had been appointed to consider this need, and that the Government had been approached with a view to our acquiring Gwydyr House, next door to the Institution, when it should become vacant.

The great events of succeeding years prevented anything being done, and probably this is not a propitious moment for taking up the broken threads, but it is evident that the question should not be lost sight of.

When the Imperial War Museum was started, it was suggested that our Museum should form a portion of it; but it is almost needless to say that the Council never seriously considered the proposition or had the slightest idea of leaving the shelter of the historic walls of the remaining portion of the Palace of Whitehall. On the other hand, they were strongly in favour of taking over the Imperial War Museum and incorporating it with itself, if a new and specially designed building were provided to meet all the requirements of the case. Had this latter offer, which was made, been accepted, it would probably have resulted in a considerable saving to the country.

It is very satisfactory to note that during last year 63 schools, admitted free, visited the Museum, as against 34 during the preceding year. Where can there be found a better antidote for Socialism, Communism, Bolshevism, and other damnable "isms" than among the glorious naval, military and other relics to be seen here?

Touching for the King's Evil at one time took place in the Banqueting Hall, and it was asserted that Charles II. once handled a scrofulous Quaker and made him a healthy man and a sound Churchman in a moment! Would that we had some similarly effective machinery for dealing with the Social Evils above mentioned!

No Institution has, or has had, a better staff than our own, and it is with deep regret that I draw attention to the recent death of Mr. John Smith (formerly 1st Class Petty Officer, R.N.), who had been a Museum attendant for 26 years, and who, by himself or in collaboration with Mr. John Preston (formerly 1st Class Petty Officer, R.N.), restored and rigged so many of our ship models. His loss will be much felt, as there are now few men capable of doing this class of work.

It now only remains for me to thank most cordially, on behalf of the Museum and General Purposes Committee, Lieut.-Colonel Sir Arthur Leetham and his staff for their valuable services during the year under review.

Admiral SIR R. G. O. TUPPER, K.C.B., C.V.O.: I should like, if I may, to ask a question on the subject of finance. I do not know what has happened before in regard to the matter, but would it be practicable and advisable to charge members an entrance fee for themselves and their guests on great occasions to witness ceremonies from our building. I had the good fortune the other day to bring two ladies here; it was a very pleasant occasion and the building was full of people. Sir Arthur Leetham told me some time ago, when I asked him about the matter, that it had been settled that there was to be no charge, and that members could bring two friends. It struck me, when I read the Annual Report and found that we were over £1,000 to the bad, that

possibly the Institution might have secured a few hundred pounds towards the deficit that day. I do not know what the policy of the Council is in regard to the matter. We hope that in the future there will be several more interesting pageants at no very distant date, and I think possibly we might get a little money to help the Institution in that way. The other question I want to raise relates to the membership. I notice from the detailed account of the membership that from the Royal Naval Reserve, which includes I suppose the R.N.V.R., we have only 36 members, and from the Overseas Forces only 21 members. It seems to me that a special effort might be made to induce officers of the R.N.R. and the R.N.V.R. to join this splendid Institution, and feel sure that a good many of them do not know much about it. I have taken every opportunity myself of talking to individuals about the Institution, and I hope one or two of them have joined. I really think that, if the R.N.R. and the R.N.V.R. officers knew the great privileges which this Institution confers upon its members at a very low price, we should get a much larger number of members. As regards the Overseas Forces, I suppose the Overseas Club, which has recently been started, will rather keep members from joining the two Institutions, but I should very much like to see the Overseas Forces much better represented among the membership of this Institution than by the small number of 21 officers.

Commander CABORNE, C.B., R.N.R.: With reference to Sir Reginald Tupper's remarks, I may state that in 1913 we, through the courtesy of the Registrar-General of Shipping and Seamen, were enabled to send a large number of circulars to individual officers of the Royal Naval Reserve, and also endeavoured to obtain the assistance of two great organizations connected with the Mercantile Marine. Our efforts at that time were moderately successful, but the Great War brought matters to a standstill, and in the meantime members have fallen out. However, we will do our best to increase the number, although, owing to the unprecedented depression in merchant shipping, this is not a very favourable time for operations.

Personally, I never neglect an opportunity to enlist officers of any of the Services, naval or military, and if all other members of the Institution would do the same our finances would soon be in a very flourishing condition.

Captain SLACK: With regard to the question of finance, I am glad we are not so badly off as we were last year by a thousand pounds. I recollect speaking to a general officer of the Guards some time ago about the Guards officers joining the Institution, and he said: "We all join it." I am afraid that is not so, as I see that the total number of Guards officers who belong to the Institution is about 80—there are about 300 officers in the Guards—surely they could help us a little more. Dealing again with the question of finance, I should like to ask whether the Government could not be induced to give us a larger grant. Lord Curzon was able to increase the grant to the Royal Geographical Society three years ago from £500 to £1,200—I believe that is the amount now given to that Society, so that I think it is only fair to assume that if we displayed a little more energy our grant might be increased.

THE CHAIRMAN: With regard to the remarks made by Captain Slack, there is no doubt that financially we are in a better position now than we were last year, because the adverse balance against the Revenue Account has gone down by £1,000 or more;

and it looks, so far as we have gone this year, as if we are now entering upon a rather better financial state of affairs. We hope that things will still further improve. The report deals with the subject of the Government Grant. I should like to draw the attention of the members to the great importance of their doing all they can to obtain new members for the Institution, not only for the sake of the increased subscriptions that would thus be obtained, but also because they will get the benefit of the most educative Journal which is published by the Institution. That Journal contains very excellent articles. I have had a long connection with this Institution, and I can certainly say that, during that time, so far from the standard of the articles having fallen back, it has greatly improved of recent years. With regard to Admiral Tupper's remarks, we quite agree that some steps must be taken in the future with regard to the use of the building on great occasions. The Secretary has brought the question before the Council. The present arrangement was not, I believe, very satisfactory upon the last occasion. There may be in the future even greater occasions, and it is desirable that some change should be made. The Council have considered the matter; but I do not think they are inclined to make a charge, because, after all, it is one of the advantages of membership of this Institution that the members should have the use of the building on these occasions. It is quite clear, however, that we shall have to restrict in some way the right of entry on those occasions to a limited number of members and their friends. Those are the general lines on which the matter will be dealt with. The subject will be further considered by the Council, because we are all agreed that some steps must be taken. With regard to the Grant from Government, these are not very good days for asking for money from the Government; nobody knows that better than those connected with the War Office and the Admiralty. We have asked and we may ask again, but all that I can say is that we have not got the increased grant we asked for. Of course things may be better from the point of view of finance in the future. I am sure this Institution is of great value, and I believe the Government appreciate that point and that they will do what they can for us. I am sure we all appreciate the very great value of the museum; I am glad to see that the attendances have not fallen off during the last year. As Commander Caborne said, there is no place that you can take a young fellow to that is more interesting than our museum, which has been so much improved under Sir Arthur Leetham. It contains a very valuable collection, not only from the point of view of the Navy and the Army, but also from the point of view of its general historical interest.

Those are all the remarks I have to make, and I will now move: "That the Report and Accounts, as circulated, be taken as read and adopted."

Colonel C. W. TROTTER, C.B., T.D.: I have much pleasure in seconding that.

The resolution was then put, and carried unanimously.

Admiral SIR HENRY BRUCE: I beg to propose: "That the thanks of the Meeting be accorded to the Auditors, Messrs. Wilde, Ferguson-Davie and Miller, for their services, and that they be re-elected Auditors for the ensuing year at a fee of twenty-five guineas."

Colonel SIR DUNCAN ROBERTSON: I have great pleasure in seconding that.

The resolution was then put and carried unanimously.

THE CHAIRMAN: We now have to fill up the vacancies on the Council. For the Royal Navy, for which there are two vacancies, Admiral-of-the-Fleet Earl Beatty and Admiral Sir Reginald Tupper have been nominated. For the Regular Army, for which there is one vacancy, General Sir Edmund Barrow and Lieut.-General Sir H. S. G. Miles have been nominated. The Council have considered the position, and, with your approval, they would be prepared to accept both the nominations that have been made for the Regular Army. There is no member on the Council representing the Indian Army at the present time. General Hutchinson was the last representative we had on the Council of the Indian Army. If you approve we will co-opt General Sir Edmund Barrow and make him an extra member until an Army vacancy occurs, which will probably be before very long. He would be an extra member until that time, and after that he would join the Council. If you agree to that suggestion it will avoid the necessity of having a ballot. May I put it to you that the suggestion be adopted?

The motion was then put, and carried unanimously.

THE CHAIRMAN: It will be unnecessary, therefore, to have a ballot. Earl Beatty and Admiral Sir Reginald Tupper are elected on behalf of the Royal Navy, and General Sir Edmund Barrow and myself on behalf of the Regular Army.

GOLD MEDAL ESSAYS, 1921.

THE SECRETARY: I have the honour to read the Report in regard to the Gold Medal Essays for 1921:—

"The Council, having duly considered the Report of the Referees, have rewarded the writer of No. 9 essay, bearing the motto, "Ponder the path of thy feet, and let all thy ways be established," the first Trench-Gascoigne prize of 30 guineas and the Gold Medal of the Institution.

The writer of No. 10, bearing the motto, "In utramque fortunam firmus," the second Trench-Gascoigne prize of 20 guineas.

The writer of No. 2, bearing the motto, "Tria juncta in uno," the third Trench-Gascoigne prize of 10 guineas.

The envelopes containing the names of the writers of the essays were then opened, and the Secretary announced that the first prize of 30 guineas and the Gold Medal of the Institution had been awarded to Flight-Lieut. C. J. Mackay, M.C., D.F.C., R.A.F.

The second prize of 20 guineas to Squadron-Leader A. A. Walser, M.C., D.F.C., R.A.F.

And the third prize of 10 guineas to Captain R. P. Ernle-Erle-Drax, D.S.O., R.N., Royal Naval Staff College, Greenwich.

Brigadier-General the Rt. Hon. THE EARL OF LUCAN, K.B.E., C.B.: I have much pleasure in proposing: "That the thanks of the Institution be accorded to Air-Marshal Sir Hugh Trenchard, Bart., K.C.B., D.S.O., Major-General Sir P. P. de B. Radcliffe, K.C.M.G., C.B., D.S.O., and Rear-Admiral C. T. M. Fuller, C.B., C.M.G., D.S.O., for adjudicating on the Prize Essays."

Captain R. P. ERNLE-ERLE-DRAX, D.S.O., R.N.: I have great pleasure in seconding that resolution. I am sure everybody will agree that these officers have had a very

important duty to perform, which has involved them in much labour, apart altogether from the other duties that they have to carry out. I am sure it is a matter of great difficulty for them to adjudicate on the essays that are sent in. I am more able to appreciate the labour that is involved because they had the misfortune to have to read some remarks that I wrote myself, I being an officer somewhat ignorant of matters to do with aircraft. Having read all these essays and adjudicated upon them, they deserve the most cordial thanks of the members of the Institution, and I therefore have great pleasure in seconding the resolution.

THE CHAIRMAN: I may say that I have had some experience of reading these essays on previous occasions, and I know therefore that we are really under a great obligation to the officers who have carried out this duty on the present occasion. The work takes up a considerable amount of time, and that amount of time has not been decreased of recent years, owing to the various implements which are used in the perplexities of warfare under modern conditions, so that the task of reading the essays is rendered more difficult than ever for them. I have much pleasure in putting the resolution.

The resolution was then put, and carried unanimously.

Admiral SIR R. G. O. TUPPER, K.C.B., C.V.O.: I have the honour to move the following resolution: "That the thanks of the Institution be accorded to the following retiring Members of the Council:—Admiral of the Fleet Earl Beatty, G.C.B., O.M., G.C.V.O., D.S.O., Captain H. D. Briggs, C.M.G., R.N., Lieut.-General Sir H. S. G. Miles, G.C.B., G.C.M.G., G.B.E., C.V.O."

Lieut.-General SIR NOEL BIRCH, K.C.M.G., C.B.: I beg to second that motion, and at the same time to congratulate you, Sir, on your re-election to the Council.

The resolution was then put, and carried unanimously.

THE CHAIRMAN: Gentlemen, On behalf of the retiring Members of the Council, I thank you very much for your kind vote of thanks.

General LORD HORNE, G.C.B., K.C.M.G., A.D.C.: Mr. Chairman and Gentlemen, it is my pleasant duty to move: "That the thanks of the Institution be accorded to the Chairman for presiding at this meeting." Sir Herbert Miles has taken the place of Lord Beatty to-day. His services to the Royal United Service Institution are well known, and he is always ready to do what he can to assist us.

Major-General W. H. ANDERSON, C.B.: I have much pleasure in seconding the resolution.

The resolution was then put, and carried with acclamation.

THE CHAIRMAN: Gentlemen, thank you very much. That concludes the business of the Meeting.

The meeting then terminated.

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Director of Publicity.
11, RED LION SQUARE, LONDON, W.C.1.
Telephone No.—Holborn 6191.
Telegraphic Address—"Gilberwood, London."
Bankers—Bank of England.

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